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The Practical Photographer

An Illustrated Monthly of Technical Photography

Editors · Rev. F. C. Lambert A.M
Thos. Harrison Cummings

Pictorial Work of Charles Job

Platinotype Printing

Boston London

Choice of Mount

THESE selections of a suitable mount or background for a picture are almost as essential as the subject itself. How often we see the beauty of a photograph destroyed by the effect produced by placing it against a mat of different tone, and out of all harmony with it. The experienced photographer is as careless in this respect as the beginner. Picture mounts in six shades of sufficient depth of coloring are made by

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The Pictorial Work of Charles Job.

By THE EDITOR.

MR. CHARLES JOB'S position among present-day pictorial photographers is indeed an enviable one. Having selected a certain class of subject and manner of treatment, he has made for himself a position which at once commands the admiration of the realist and impressionist. But while both claim him as a member of their ranks, yet neither can say that he does not possess the qualities of the other school

Answering for himself, he would disclaim any hard-and-fast demarcation and simply ask to be allowed to follow his own impulse both as to choice of subject and manner of presentation. Nor would he make any pretentious claims on his own behalf as to craftsmanship, although his works amply proclaim him to be a worker of quite exceptional technical skill. It is not saying too much to advise every one of our less experienced readers to pay the most careful attention to each of the nine reproductions; for there is not one of them that will not convey most valuable lessons both in artistry and craftsmanship.

Let us not forget that Mr. Job is an "old hand," having started photography in 1870 with a 5 × 4 wet-plate outfit. It is only those of us who have gone

through the wet-plate treadmill of landscape work who know the physical fatigue and constant anxieties attendant upon out-door photography in those early days. Like many other early workers, he presently laid photography aside in favour of another hobby. But after a ten years' interval he returned to photography again, now adopting a $7\frac{1}{2} \times 5$ size. Soon after this he joined the London Camera Club, at that time humbly domiciled in Bedford Street, and during the intercourse with the members a further stimulus towards pictorial work was received. Mr. Job generously acknowledges the encouragement and promptings he received by examining the work of his fellow club-members. About that time also he joined a certain well-know postal club, and continued his membership until quite recently. These two clubs are here mentioned as showing that the way to learn something about the true worth of one's own work is to compare it with the work of others, and also to pay thoughtful attention to the honest opinions of other workers. Mr. Job freely admits that the postal club has proved both interesting and helpful to him in his work.

For some little time past he has been using a quarter-plate hand and stand camera, which accompanies him on his frequent little cycle trips around the district of his seaside home. He uses a rapid plate, preferably a backed colour-sensitive one, with, of course, a suitable light filter. Mr. Job's usual exhibition work is about 15 × 12; but this for the most part is from enlarged negatives from quarter-plate originals. The enlarged negative is on a moderately slow landscape plate made by means of the oil lantern. Those who are familiar with the fine quality of Job's work, seen year by year on the Salon walls, may thus learn to respect a quarter-plate negative, at any rate when it is in the hands of such a skilful worker.

As to art matters, we cannot do better than quote Mr. Job's own words in a friendly letter to the present writer: "If all our coming photographers could have an art education to start with, the resulting work would be better than anything that has been done up to now. To do artistic and

true work one must have some art education. Then one starts fair. Most of us started very badly handicapped for want of this education, and it has taken us years to find out and correct our errors of composition, values," etc.

We are exceedingly glad to quote this entirely sound and sensible, practical sentiment, because at the present time there is a tendency among a certain few loud-voiced talkers in the photographic ranks to scoff and sneer at art education. They remind us of the fox who, having lost his tail in a trap, tried to persuade all his companion foxes to cut off their tails to follow his fashion. We are told from time to time that all the photographer need do is to "go to nature" only for instruction, guidance, education. In other words, this is simply laudation of the self-taught man, who, as Sir Joshua said, had a very ignorant person for his teacher.

The open-minded possessor of this book has an answer to this decrying of art study and education. Our very small selection of Mr. Job's pictures herewith given—a small percentage taken from his charming home gallery—all go to show what study, backed up by taste, can and has accomplished.

Taking them in any order we please, we cannot but find them helpful, suggestive, instructive.

"On Guard."—The simple dark background and long narrow shape are in excellent harmony (and "keeping," as the painters say) with the theme. The few strong lights on the armour are just enough to suggest its metallic nature without being obtrusive. The quiet, thoughtful expression on the face is again in good taste with the quiet style of treatment. The lighting is broad and effective. The margins of the picture are wisely kept well subdued.

"Ploughing on the South Downs."—It was a happy thought to catch the ploughman with his back to us, and also to get the horses standing out against the sky-line. The lighter tones of the ground behind the man help to give emphasis to his figure. The position of the man's arms and legs are very happily caught. The old village church to our right reminds us of man's first work to till the

ground and wring from it his daily bread, and finally to be himself sown in "God's acre," as our forefathers called the churchyard. The simplicity and directness of the composition is an eloquent lesson in the greatest art of all, *viz.*, the art of leaving out.

The Return of the Flock.—In this instance we have a picture where the artistic sentiment is strongly pronounced. The fine evening sky at once suggests glowing yellows, reds and purples. The homeward trending flock tells us of declining day. The shadows are lengthening, and Sol is casting a sheaf of golden arrows in our face ere he gathers round him the cloud curtains of the night. The tree coming against the strong lit sky enforces the light value of the higher tones. No human beings are in sight, but we miss them not for the bleating flock recalls the thought of the shepherd not far away. The leading lines of the composition draw our attention along the road and on to the chief light of the picture.

Snow and Sunshine.—Here we have an example of the fine craftsmanship as well as artistic judgment of our artist. Perhaps there is nothing more crucial, more trying to the photographer than the rendering of sunlit snow. The temptation to under-expose and then over-develop seems almost universal whereas it were wiser to err both on the side of over-exposure and under-development rather than produce the usual snow scene of gradation*less* white paper. Here again is a lesson in simplicity and the art of leaving out what is not wanted. Be it noted that in winter the sky is often darker near the horizon as here shown, while in summer the horizon is often the lightest part. Note also how the leading lines draw our attention to the chief high-light, *i.e.*, the sun-lit bank of snow contrasted with the tree beyond.

Evening Calm is an entirely charming picture—full of the poetry of suggested colour. Just the kind of subject that one can imagine would appeal to the great Turner. Once again we note the concentration of interest in the sail-clad vessel giving us our chief high-light and the other dark objects

Evening Calm

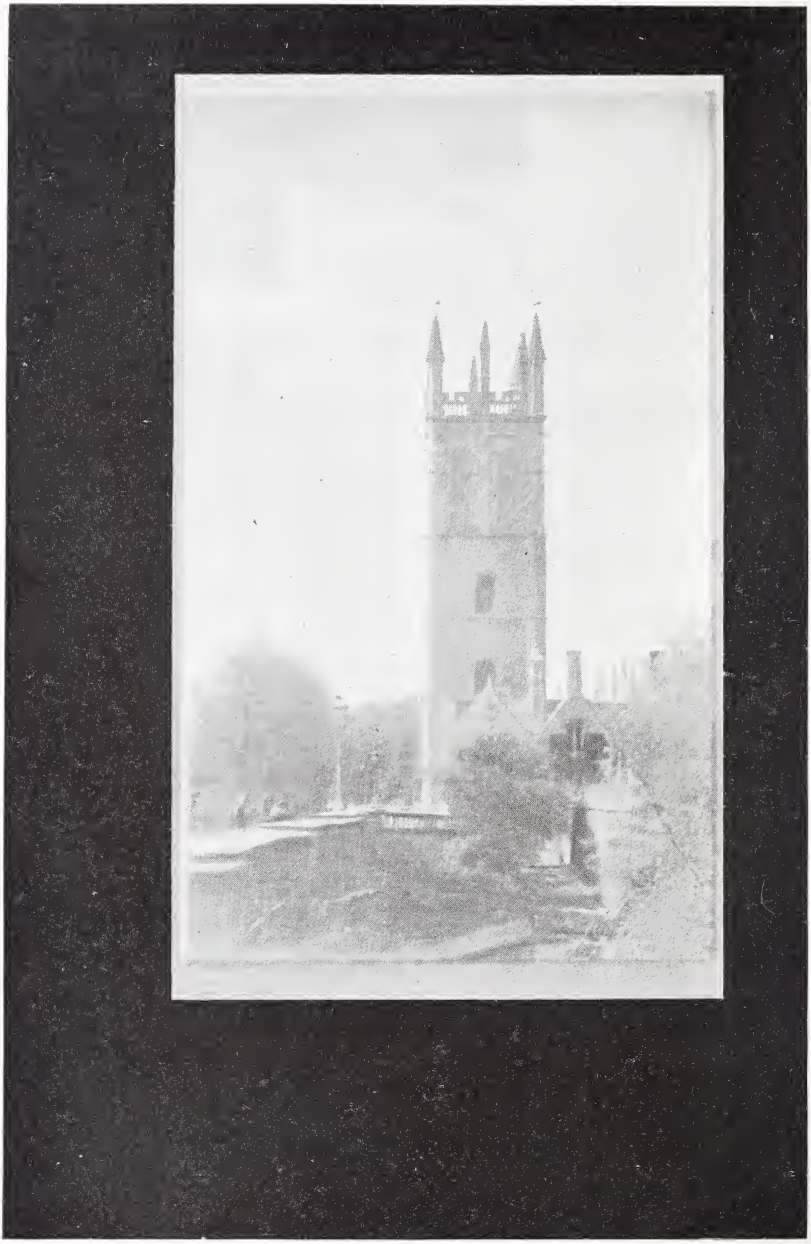


Fig 3. BORDER PRINTING. F. C, L.

grouped around. The man in the small boat to our left is a happy touch aiding greatly in the suggestion of space and distance. To concentrate interest on the craft and suggest quiet and calm, quite wisely the sky has been treated with artistic restraint. There is just enough suggestion of hazy atmosphere to suggest that half-sultry calmness when sounds seem magnified and distances reduced. The subtle gradation in every part of this fine work should be studied with patience and care.

The Top of the Hill is an altogether charming example of refined taste and skilful handling. The pose and placing of the figure in the picture space are eloquent lessons in composition. The texture rendering of the man's smock cannot fail to be noticed. The massing of the flock behind the shepherd shows that our artist has an eye quick to see and a prompt hand to seize his subject at the critical moment. The subdued treatment of the hills in the distance, lightened and simplified by ærial perspective, will, of course, be noted for our own future guidance. The wise subduing of strong interest in the sky also teaches us its lesson. For, of course, the reader has already laid it well to heart that no one part of a good picture competes with any other part. The law of principality at once makes the shepherd the feature to which all other parts are duly subordinated.

Carting Beach is an example of a subject treated in bold broad masses of light and shade. The cart and two men near us form a most impressive group, but it is open to question whether the horse at some little distance away—strongly relieved against a light ground—does not somewhat weaken the cohesion of the composition as a whole. It is perhaps just one of those cases where one feels that we have a good thing before our lens despite some portion which is not all that could be desired.

Perhaps this may show how far Mr. Job occasionally swings the pendulum towards the impressionistic camp.

Strand on the Green.—By accident rather than design this in turn shows us a picture which goes somewhat towards the realistic side of pictorial

photography. It is indeed so hard to say which of the two schools deserves most support that we lean to the opinion of the learned judge who said "the best judgment was always that which is withheld." When both give us so much artistic enjoyment why adjudicate at all? If the violet is sweet smelling may not the rose also find favour? This picture irresistibly reminds one of a mezzotint in quite the best style of that charming art method, and there seems an especial fitness between this old-world bit of "near London" and its style of treatment. Note once again the broad arrangement of light and shade, and how the dark trees help the light falling on the face of the houses. The trimming of this picture shows excellent taste. The rendering of the water and suggestion of clouds are also quite delightful.

A Woodland Path.—Let the reader mentally contrast this with "the usual thing"—*i.e.*, "*f*/64, and every leaf sharply defined." Such a thought gives one cold shudders, and suggests trees bearing cast-iron leaves—or things made of wire. Here we have not a single leaf sharply cut, but instead of seeing *a* leaf we have foliage—leaf-clad trees in all the beauty of their varied lights and shadows. Broad masses of inviting leafy shade. The path at our feet suggests a stroll beneath their umbrageous protection while we look beyond upon the glowing light of summer sun. The broad treatment of these trees should be carefully studied by every landscape camera man. Let him note the absence of sharp outline, of solid dark, of glittering light. It is not a presentation of separate leaves, but of foliage.

All too soon do we find ourselves at the end of our enjoyable wanderings in "pastoral scenes and leafy lanes" under Mr. Job's sympathetic guidance. Not only may we gather pleasure and instruction from them, but what is perhaps even yet more valuable, *viz.*, a new eye to look for beauty hitherto passed over. Perhaps it is not overstating matters to say that the education of the eye is the true foundation of all graphic arts, and without this we are only building on a foundation of sand.

Introduction to Platinotype Printing.

By E. T. Holding.

PLATINOTYPE printing is one of the simplest and most satisfactory processes in the whole practice of photography. The process itself offers so few difficulties, and the results obtainable so many advantages over most other printing methods, that it is surprising it has not been more widely used by the amateur worker. Compared with carbon printing, certainly we have not such a range of colour, and compared with bromide printing, those of limited leisure have not the advantage of being able to carry through the whole operation by artificial light. But when this is said, what process can compare with platinotype for absolute permanence of result, for beauty of tone, and for the simplicity and speed with which these results may be obtained?

Permanency is ensured by the fact that a platinotype print consists of a fine deposit of platinum, with a pure paper support. The first is a metal which is, of all metals, the least liable to deterioration by any known reagent, whilst the paper upon which it is deposited is, if of the right quality, not likely to perish under ordinary circumstances in less than some hundreds of years. Here, then, we have a means of handing down to posterity our choicest productions, with a full assurance that, whether they are worthy of such a measure of immortality or not, they will at any rate survive the ravages of time. Permanence alone would not ensure popularity to any photographic printing process. But, as hinted above, the tones we may command in the simpler branches of platinotype printing are enough in themselves to make us enthusiastic. They range from a rich and vivid black to the most delicate pearly grey, and from a deep sepia to a golden brown. Further than this, as will be demonstrated by other writers in this number of *The Practical*

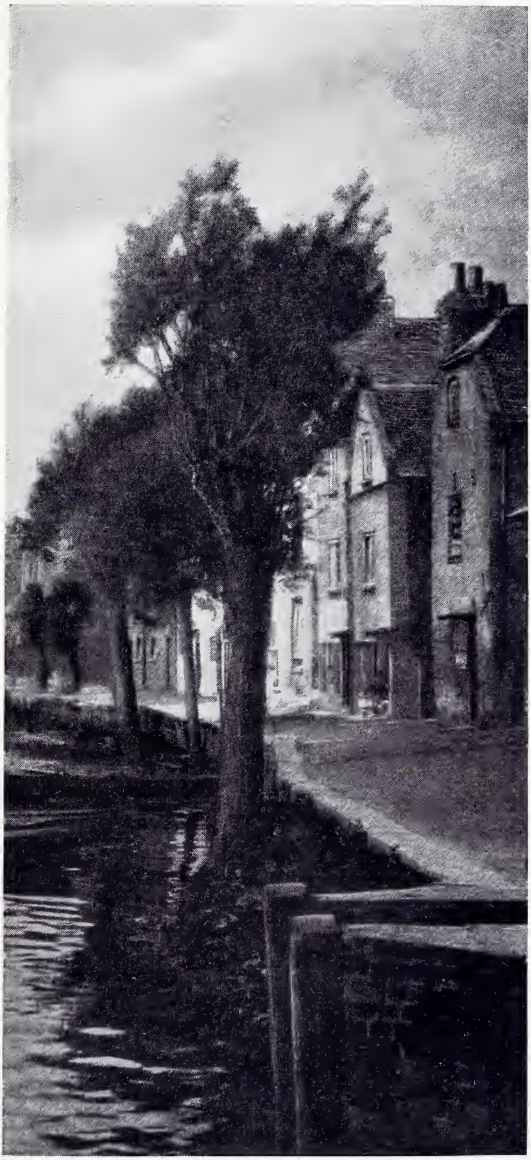
Photographer, other colours may be obtained, but I speak only of the simpler operations of ordinary development, and of tones within the reach of the beginner.

Care of the Paper. The paper is purchased in tins, which are sealed in order to protect their contents from atmospheric action. A small lump of chloride of calcium is included in each tin, to absorb any moisture that may be in the air enclosed in the tin when it is sealed, or which may penetrate after the tin is opened.

The paper should be transferred from the packing tin to a properly constructed tube, from which pieces may be removed as required. This is known as a "calcium tube," and may be purchased in various forms. It consists of a metal cylinder, capped at each end, and divided into two compartments by a perforated partition. The smaller compartment contains pieces of calcium chloride. This will be found to be a hard substance which, so long as it remains hard, indicates that the air in the tube is perfectly dry. Should it become soft, proving that it has absorbed moisture, it should be dried on a shovel over the fire, or in an oven. The supply in the storage tube may be renewed from time to time by inserting the pieces removed from the tin in which the paper is purchased.

The larger compartment holds the paper, which is protected from contact with the calcium by the division. The edges of the lids, which fit closely to the cylinder, are covered with rubber bands which make the joints air-tight, and preserve the paper from damp and contact with the atmosphere. In this way the paper will keep good for a considerable time. It has been known to keep in good condition for years, but at any rate may be relied upon for some months.

The paper, in all operations preceding development, should be handled with care, and in subdued daylight or artificial light. The fingers should not be allowed to come in contact, more than is necessary, with the sensitive face of the paper, which is easily distinguished by its lemon yellow colour. It will be found that the paper is rolled with the



Strand on the Green

sensitive side convex. This method should be observed when rolling the paper to re-place it in the tin, as the curl thus made will be useful in development.

Varieties of Paper. There are some half-dozen makers of platinotype paper now selling their productions in Great Britain. It does not come within the scope of my remarks to mention these in detail, nor is there, so far as I have experienced, much to choose between them for quality. The paper can be obtained in a variety of surfaces, ranging from smooth to very rough. There are also papers specially prepared to produce sepia prints, and there are some papers in which the image prints out, and which do not need, as the ordinary paper does, development before the picture is finished. These I shall deal with later, and speak first of the manipulaton of the ordinary paper for black tones.

The Negative. Little need be said as to the best kind of negative for this process. In these days of individuality in photographic work, it verges on the impertinent to suggest to a worker that this or that kind of negative suits this or that method of printing. The platinotype print will do as full justice to a given negative as any other process. If the negative is vigorous it will yield a vigorous print. The process will render detail as well as it will render breadth. It prints quicker than the ordinary printing out silver paper, so that results are obtainable from dense negatives in less time than by that method. Vigour can be infused into prints from weak and toneless negatives by methods which will be described.

Printing. Stress has been laid on the necessity for keeping the paper dry. This care must also extend to the printing frame and pad, which should be perfectly free from damp before using with platinotype paper. In case of doubt they should be dried before the fire or in direct sunshine before use.

Place the paper with its sensitive (yellow) side next to the negative; and between it and the back of the printing frame place a sheet of some

damp-proof material, such as thin sheet rubber, or the oiled paper used in letter-copying books, or use an old film. Print in a good light (even direct sunshine may be sometimes used) until all but the most delicate detail is observable in the print, which may be examined from time to time in a subdued light. The image will appear in a faint purple colour, and the printing will have been carried far enough when it has reached the appearance of Fig. 19. The paper should then be removed from the printing frame. If it is not convenient to develop at once, replace the printed paper in the storage tube, where it may remain for any reasonable time before it is developed, as no further action appears to take place between printing and development if the paper is properly cared for. Some workers will develop the accumulated prints of a week or longer at one operation, while others prefer putting the print direct from the frame into the developer.

Development. The object of development is to turn the faint purple image into one of the strength and colour desired. Prepare as a stock solution the following:—

Potassium oxalate	2 oz.
Potassium phosphate	½ oz.
Water	14 oz.

In mixing this stock solution hot water may be used for dissolving the crystals, as with cold water it is a lengthy operation. Let the solution cool before use. If blue-black tones are required, the solution should receive the addition of sufficient oxalic acid to make it slightly acid, say from 40 to 60 grains.

For use dilute a portion of the stock solution with an equal quantity of water, and use it at a temperature of 65°F. If colder than this granular prints will result. This diluted solution may be used repeatedly, so long as it operates successfully. It should be kept separate from the stock solution, and as it becomes used up, additions made from the stock solution in the above proportions. To develop the print, place the developer in a porcelain dish, letting the developing solution be at least one inch deep, and the dish large enough to allow the print to be freely handled

while in it. Immerse the print, face down, in this bath, taking care to avoid the formation of air-bells on the face of the print. Perhaps the best method of immersing the print is as follows:—On removing the undeveloped print from the tube or printing frame it will be found, as already stated, to have a slight curl, with the sensitive side convex. The paper can therefore easily be placed in the developer by first immersing, say, the left edge and then bending the print straight until all is under the surface of the bath. This method of immersion will force out any air that might get under the print, and allow the developer to do its work immediately. As soon as immersed, turn the print face up. If it is found that in spite of care some bubbles have formed on the face of the print, touch them lightly with the finger and they will disappear. The circular spot they make will develop out, but sometimes a slight mark remains. A little practice will ensure proficiency in this matter. The print will develop quickly, the image turning from grey to a deep rich black. It should remain in the developer until the desired tone and depth are attained (Fig. 18). No attempt should be made to rush a print through the developer in order to save, say, an over-done print. The only result of such a proceeding will be a half-developed and granular print.

Clearing. When development is complete, prints should be transferred direct, without intermediate washing, to a clearing bath made up as follows:—

Hydrochloric acid	1 oz.
Water	60 oz.

Each print should have three baths of this solution, remaining about five minutes in each. The object of the bath is to remove the iron salts which are used in the production of the platinum image, and it is necessary that these salts should be entirely removed from the print. It will be noticed that though the development has removed a certain amount of the yellow colour of the paper, there is still much remaining when the print is placed in the first acid bath. This will have the effect of turning the first bath yellow, and probably the second

also, but in a less degree. The final acid bath should remain perfectly clear and colourless after the print is removed, otherwise yet another bath is necessary. The same bath can be used for more than one print at a time. A good plan is to fill three dishes with the bath, so that prints may be transferred from bath No. I. to bath No. II., and so on. When bath No. I. becomes very yellow it should be thrown away, the dish re-filled and used as bath No. III., No. II. becoming No. I.. always keeping the final bath quite clear.

After this clearing, the prints must be washed in running water for ten or fifteen minutes, or in a few changes of water, to remove the hydrochloric acid. Should this washing be insufficient to entirely remove the acid, the print would not suffer, but the acid remaining might possibly cause the paper to decay prematurely.

The print may now be dried between sheets of blotting-paper, or by hanging up. If necessary, heat may be used to accelerate the drying process, after which the print is ready for mounting, or it may be mounted while still damp. It will be seen that the whole operation is extremely simple and expeditious. By the use of heat for drying purposes a dry and mounted platinotype print can be produced in about half-an-hour.

Hot or Cold Development. It is, I believe, practically the universal custom now to produce black tone prints by the cold development process above described. Some workers, however, prefer the hot bath method, although it is difficult to say why. The only difference in the process is that the developer is used at the strength of the stock solution, and is heated to a temperature of 100—150° F. In this bath the development is almost instantaneous, the image coming up to about full strength immediately the print comes in contact with the bath. For those who have large quantities of prints to develop, this of course is an advantage, as the working is carried through much more quickly than by the cold bath process. But for him who works in photography for the love of it, *i.e.*, for the amateur, the cold bath has distinct advantages. It enables one to watch the

THE TOP OF THE HILL.

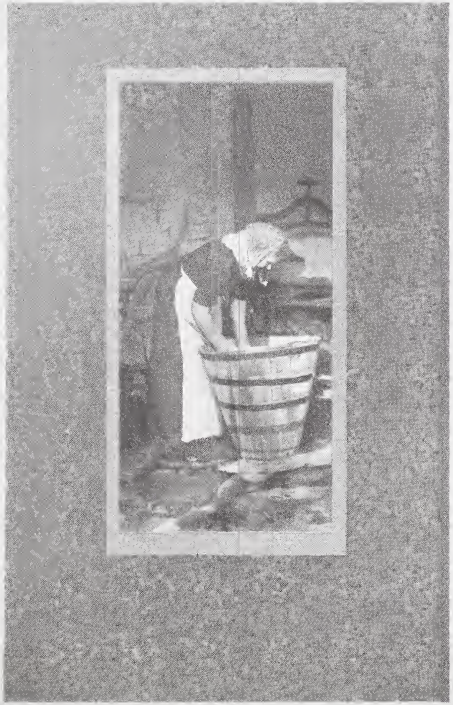


Fig. 6. WASHING DAY. J. A. Pitchforth.

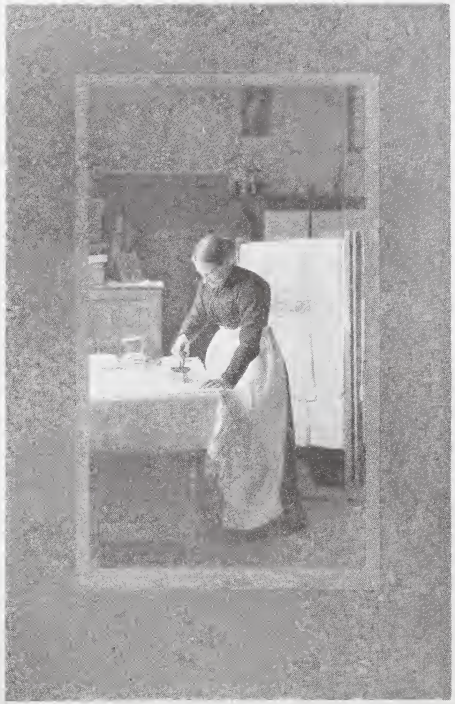


Fig. 7. IRONING. J. Harbottle.

delightful process of development, and it dispenses with the bother and need of keeping the developer at a given temperature. A special paper is necessary for the hot bath for black tones, as the ordinary black paper if developed at a higher temperature than 65° F. will attain a brownish colour. Of this I shall have something to say later. The developer may be heated in the porcelain developing dish over a spirit lamp or gas, a thermometer being used to gauge the temperature. If a sheet of tin be placed between the flame and the dish, there need be no fear of cracking the latter. It is better to use a porcelain dish than one of enamelled iron.

Modification. Much may be done with a print during development to improve its ultimate tone. We are by no means confined to the black or blue-black tone in the use of "black tone" paper. If, as stated in the preceding paragraph, a temperature higher than 65° F. be used, the colour of the print will be found to be of a slightly brownish tone. This, in the opinion of some workers, is much to be preferred to the cold black tones. That, of course, is a matter of taste. But of the fact that the temperature affects the colour of a print, advantage may be taken in more ways than one; for the warmer the developer the further will the development go, and what would be an under-timed print for a cold developer, may be a fully-timed print for a developer heated to 170° F. In illustration of this I show in Fig. 17 a reproduction of a print which has been cut into two pieces before development. The print was slightly under-printed for cold development, as will be seen by looking at part A, which was developed at 65° F., and in the original has come out a flat, under-done print of a cold grey colour. Part B was developed in the same bath, heated to 170° F., and has produced a print, apparently fully-timed, with full gradation, and, in the original, of a rich, warm brown-black of a very pleasant colour. Had the developer for part B been heated to boiling point, the result would have been an over-timed print, and with the higher lights degraded. We may therefore use these facts in two ways. If a warm black is desired, slightly

under-time the prints and raise the temperature of the developer. And on the other hand, if by any chance the print has been removed from the printing frame before being fully printed, the heated developer will save what otherwise would be a faint and toneless picture. The last point mentioned will doubtless be of more use to the beginner than to the practised worker, as it is not quite easy at first to judge when the printing has gone far enough. I should advise the beginner to cut off a bit of the print if there is any portion that he purposes trimming off before mounting, and trying this little piece in the normal developer before immersing the entire print. If it does not reach the desired strength of colour, the warmer developer will bring it up to the necessary strength.

Over-exposed Prints. Should a print have become over-exposed, *i.e.*, over-printed, we must not develop it in the normal bath. The developer should in this case be diluted with water to half its strength, and the print removed to the clearing bath on attaining the right stage of development. Or the print may be developed in the usual developer, and a dark, over-done print result, which may be toned by the Packham formula mentioned on page 63, which requires an over-timed print for its best result. Or glycerine may be introduced into the developer as described on pages 15, 56.

Sepia Papers. The brownish tones mentioned above are in reality only a shade or so removed from black. For the production of genuine sepia tones, either the special papers prepared for that colour may be used, or the developers described by other writers in this number may be adopted.

There are one or two sepia papers which may be purchased requiring hot development; others for cold development. Special development salts are recommended for use in each case, and although more or less satisfactory results may be obtained by the use of the developers given above, the special developers are strongly to be recommended.

The sepia papers are more sensitive (*i.e.*, to light) than the black, and will not keep as well. I have found that the hot bath paper gives a darker and richer colour if kept in the sealed tins for a few months after manufacture, the new paper being rather inclined to be "hot" in tone. The developer should be heated to 150° F. for the hot development paper. The subsequent operations are the same as those already described for black papers. Special care should be exercised in keeping the paper from direct daylight during the development and first clearing bath.

Printing-out Paper. There are one or two makes of this paper to be had, though it has but a very limited vogue. As its name implies, it differs from the ordinary platinotype paper in that the image is clearly seen, and requires no development. The chief objection to this paper is its extreme slowness in printing, even in direct sunshine. The printing should be carried further than is desired in the finished picture, as the strength is reduced in the clearing bath. Depth of tone may be obtained by holding the print, before fixing, over the steam from boiling water. Fixing is done in a bath slightly weaker than that used for ordinary platinotype prints :—

Hydrochloric acid	1 oz.
Water	80 oz.

which bath should be repeated until all trace of the yellow stain has disappeared. Prints fixed without steaming will be found to have a delicate pearly grey tone, very well adapted for broad and simple effects.

Glycerine Methods. The operations I have hitherto attempted to describe have been concerned simply with the production of a straightforward print from the negative —a print that will give an exact positive of all the qualities of the negatives used. The most fascinating branch of platinotype printing, however, is undoubtedly that in which, with the use of glycerine, the worker is enabled to introduce such changes and modifications into his print that it shall represent what he intended, rather than merely what the lens recorded.

Control. It has been found that a developer to which glycerine has been added acts much more slowly upon the paper than in its normal state. In other words, the glycerine protects the image from the developer. The greater the proportion of glycerine, the slower the development. If, therefore, we have a print, one portion of which we wish to develop more completely than another, the part to be retarded should be developed with a glycerine-diluted developer, the normal developer being used on the other part. In the application of this principle lies boundless scope for artistic, or at any rate individualistic, interpretation of the subject depicted, and it may be utilized in the following ways:—

(*a*) For the slow development of over-timed prints, in preference to using a weak developer.
(*b*) For retarding those portions of the picture that would otherwise develop too strongly.
(*c*) For retarding portions of the picture with a view to emphasising other parts.
(*d*) For the purpose of vignetting.
(*e*) For the purpose of completely obliterating portions of the print.

In the hands of a master, then, an undeveloped platinotype print may become almost as complete an expression of his ideas as though he had himself wholly created it. Emphasising here, retarding there, and in places entirely obliterating, he works with almost as free a hand as does a creative artist. So much, indeed, depends upon the worker's individuality, his appreciation of the possibilities of the subject printed, and upon his manipulative capacity, that more failures than successes may be expected with this branch of the work. No instruction can be given in it, and all that can be done is to suggest the simplest methods of work, leaving each individual worker to face alone the artistic problems involved. Figs. 13 and 14.

Regarding point (*a*), add 1 oz. of glycerine to 4 oz. developer. This will be sufficient to retard the development of an over-timed print. Pass the developer over the face of the print with a tuft of cotton wool, or with a broad flat brush, taking care that it is evenly laid on and that it gets into the pores of the paper. For this purpose it is a good plan to lay the print face up on a piece of glass, or

On Guard.

on a board covered with American oil-cloth. A few drops of glycerine under the print will keep it flat, and prevent it sliding about as the developer is applied. As soon as the desired tone is reached place the print in the clearing bath, wiping it carefully over while in the bath with a tuft of cotton wool; otherwise the development may continue under the glycerine until the acid bath has dissolved the glycerine and got to the print.

Points (*b*) and (*c*): Coat the portions to be retarded with the above glycerined developer, and immerse in the normal developing bath. If the retarded parts do not come up quickly enough, brush them over while in the bath. This will remove some of the glycerine, and allow the normal developer to get to work. If the retarded parts are not sufficiently retarded, remove the print from the bath, blot it carefully with the blotting paper specially prepared for photographic use, coat the parts with pure glycerine, and place again in the bath.

Point (*d*): For vignetting, run a few drops of pure glycerine on the face of the print, spreading it with a clean flat brush evenly over the entire face of the print. After waiting a few minutes to let this soak well in, blot off any superfluous glycerine. Now brush the glycerine developer over the portions to be developed. Should the development proceed too slowly, use a stronger developer with less glycerine in it. Proceed until the full tone desired is obtained before placing in the clearing bath. Use cotton wool as above to remove the glycerine. The portions of the print protected by pure glycerine, and not reached by developer, will disappear in the clearing bath, leaving pure white paper.

Point (*e*): A much wider subject than vignetting. Much depends on the character of result desired. Those portions to be retained in the print may be developed either with the brush charged with the normal developer or with the glycerine-diluted developer. It may or may not be necessary to coat the paper first with glycerine. After the foregoing notes this must be left to the worker's discretion, everything depending upon the character of the result aimed at.

Notes on Platinotype.

By HENRY W. BENNETT, F.R.P.S.

IT is impossible to over-estimate the importance of eliminating as perfectly as possible all the iron salts from a platinum print. The image itself is stable, but the presence of iron in the finished print will inevitably lead to a degradation of the paper basis. This discolouration will, in extreme cases, extend to the lighter parts of the image; and a damp or impure atmosphere will intensify this deterioration and also make it occur much more rapidly.

In order that platinotype prints may be least liable to any change or deterioration, careful attention must be given to the operation of clearing. It should be regarded in the same light as fixing a negative, and considered to be equally important.

Pure hydrochloric acid should be used. This should be as colourless as possible. The strength of the clearing bath should be one part of acid to fifty or sixty of water; under no circumstances should it be weaker, and with a stronger bath there is too great a tendency to soften the paper.

The acid solution should be used very liberally, and care taken that prints are well separated. Four or five separate changes of solution should be used, the prints not remaining in any one for more than four or five minutes. This is most important in regard to the first two baths.

In using a given quantity of solution it will be found far more effective if divided into five parts than if used in three changes only, the total time of immersion of the prints being the same in each case.

A simple test for the completion of the work of the acid bath is to take some of the solution in which the prints have remained for at least four minutes and examine it in a clear glass, so that the light is transmitted through two inches of solution. This should appear as colourless as water; the faintest trace of yellowness indicates that iron salts

still remain in the prints in such a condition that further acid treatment will remove them. It will be found quite impossible to attain the freedom from iron that will satisfy this test by using three acid baths only in all ordinary cases. By using five as suggested, the acid treatment need not be prolonged, as the changes may be made more rapidly.

Development Modifications. For the development of platinotype prints neutral potassium oxalate may be used alone or with the addition of one-fourth of its weight of potassium phosphate. The latter will produce a purer black tone than the oxalate alone, which has a tendency to yield a somewhat dirty colour, especially in prints from fogged negatives that print very slowly.

The most satisfactory strength for stock solutions is, in the case of the simple oxalate bath, four ounces in fourteen of water, in the other two ounces of the mixed salts in twelve of water. These solutions may be used in this strength or diluted, but a very appreciable difference will result from the variation in strength.

A concentrated solution will produce a more vigorous print than the diluted developer yields, and it will also give a purer and colder tone. Prints from negatives with very great contrast will be much softer and more harmonious if the developer is composed of one part concentrated solution to two or three parts of water, but the quality and tone will be distinctly inferior to those developed in the concentrated solution. This difference in tone is most marked in the plain oxalate bath. For ordinary work the full strength should be used.

A concentrated solution may be used many times; it will keep indefinitely whether used or not. After using, however, it is imperative that it be kept in the dark. A diluted solution will not keep so satisfactorily; it steadily deteriorates. It should be noted that the time of development increases with the degree of dilution of the developer.

Solarisation. Solarisation is difficult to avoid in printing from negatives that are too strong for this process. Its effect may be minimised by using a weak solution for developing.

The rusty brown appearance of the solarised parts is much less pronounced, and the warmer tone of the print assists in rendering it less apparent.

Age of Paper. The ageing or maturing of the paper, after first opening the original tube, has a considerable influence on the character or quality of the prints. They are softer in their contrasts and less brilliant, and, as the age of the paper increases, distinctly warmer in tone. Paper that has been kept two or three weeks should always be used for prints from very strong or harsh negatives wherever practicable. It possesses the additional advantage that it does not solarise so readily. It is assumed, of course, that the paper has been stored carefully in a calcium tube.

Prints not developed soon after exposure are similar in character to those on paper that has been kept. A greater effect of age is produced in a given time, however, probably on account of the unavoidable exposure to atmospheric influence during printing inducing a change which continues more rapidly than the very slight effect of age in paper carefully stored.

Maxims about Mercury-Toned Platinum Prints.

By WILL A. CADBY.

IT is well to remember that a little mercury will often turn what would have been a dirty grey-looking print into a pleasantly-warm sepia picture. If the contrast in a negative is too strong, mercury in the bath helps to reduce it. The hotter the bath the more effectual the toning effect.

The mounting papers that suit black platinum prints, will be found absolutely unsuitable for those toned with mercury. As one seldom has exactly the same proportion of mercury in the bath, the tones of the prints are likely to vary considerably, consequently, mounting becomes a most important

Ploughing on the South Downs.

10. Fig. BRUSH VIGNETTING GLYCERINE DEVELOPMENT. F. C. L.

question. If a print when laid on a mounting paper takes on a pinkish hue, it is very certain that we have not selected the right tone of mount to suit the picture. But if the selection of colour is towards a warm yellow, we may safely surmise we are on the right track, and have only to beware of introducing other colours that may destroy the effect.

No absolutely cold-coloured mounting papers will suit toned prints; and even when a white is used, it should be a yellow white, like the beautiful Japanese parchments so easily obtainable now.

The number of clearing baths should be increased, but the strength should be reduced when using mercury.

On the Use of Rough and Smooth Paper.

The three grades of platinotype paper usually obtainable in England give sufficient variety for most work, although at times one could with great advantage make use of the beautiful surfaces prepared with platinum by the "Helios" firm in America.

With a correct negative the smooth paper will give detail almost equal to a P.O.P. print, and is obviously the paper to use for fine or small work of every description, such as small landscapes, delicate portrait studies, or reductions; and for copying such objects as maps or diagrams, where every detail is of importance.

Personally, I cannot imagine this paper suiting any subject that is larger in size than half-plate; for its strong point is the delicate interpretation of detail, which is not usually an essential feature in large pictures. The surface of this fine paper is admirably adapted for painting on, consequently, it is just the thing to use when the worker essays to paint miniatures on a photographic basis.

The medium paper possesses a surface of much more value to the pictorial worker, and being made in a much stouter quality, it lends itself better to the limp paper mounts that have become so generally popular. It has a slightly rough surface, and is suitable for all subjects up to whole-plate.

But probably the paper that is most strongly represented in the exhibitions is that known as rough. It is a power for good in artistic hands, having a rough surface without coarseness, and a depth and luminosity in the shadows that is, I believe, unsurpassable. It is essentially the paper to use for large portrait and landscape work.

I have purposely only mentioned the hot bath papers, as I find they are much better adapted for mercury toning during development than the cold bath papers, the latter often showing under this treatment a double toning.

Pictorial Notes for Platinotype Workers.

By CARINE CADBY.

WHEN to use black platinotype and when sepia seems entirely a personal question, as each of us has his own ideas whether a subject should be represented warm or cold.

Black and Sepia.

For instance, one might think there could be no question about the matter when winter landscapes with snow were the subjects. If snow is not cold, what is? The luminous blacks and greys that black platinotype gives seems to suggest the shadows in the snow so satisfactorily, and such a pure white can be obtained. Yet such well-known workers as Demachy and Eickmeyer have chosen to render snow landscapes in a warm brown, and this warm-toned snow has not looked as peculiar as one might suppose.

Still, for the not very advanced worker one feels inclined to advise black platinotype being used for winter and snow subjects, for mists of all kinds, and for most seascapes. But sepia for those subjects in which one wishes to express warmth; for example, an old tree, an autumn landscape (or any landscape in which one wishes to suggest sun), cornfields, sandhills, etc. Most figure studies, too, will be more pleasingly rendered in sepia than in black platinotype.

With portraits it is still more difficult to lay down any hard-and-fast rule, for here the individuality of the worker cries out for a free hand.

Steichen, when working in Paris, once refused to show a print of a sitter because it was printed in too warm a tone. It must not be seen until a black print of the portrait had been obtained; and not from any pictorial exigency, but for the purely personal reason that the sitter happened to be possessed of a very dignified reserve, which he felt could only be correctly suggested by very cold tones.

It must be remembered that sepia platinotype is complimentary to most portraits, so many faces are improved by the suggestion of warmth; and it is only the few, and these generally portraits of men, that black will suit best.

With flower studies I have found black best for rendering white and blue flowers, like the lily, snowdrop, hairbell, etc.; but for those of warmer tints sepia will be found more satisfactory.

Brush Development.

Brush development of platinotype, by which I mean using the developer with half its quantity of glycerine and working up the print with a soft brush, is a great help in getting pictorial effects.

If it is carefully and slowly carried out a vignette can be made, the head and shoulders alone being developed. Also a success can be scored off a failure —*i.e.*, a negative that is faulty in some respects can by this partial development of the print be made to yield quite a good result. Platinotype being a process that demands a negative of correct density, it is good to have this process to fall back on when our negatives are not quite as correct as we might wish.

Glycerine and brush development can be used with advantage—

(1) To vignette.
(2) When parts of the negative have to be accentuated, parts subdued.
(3) When the subject has not composed very well, and only a part of the negative is needed.
(4) When the negative is too hard.

Preparation of Platinotype Paper.

By KARL ENGELMANN.

COMMERCIALLY it is not likely to "pay" the small consumer to prepare his own paper. Nevertheless the intelligent amateur should be acquainted with the outlines of the process. Indeed it would be helpful to him in his studies to prepare a few pieces by way of experiment.

The paper to be coated must be as pure as can be obtained. It is important to avoid any kind that contains even tiny specks of iron, zinc, or brass. The amateur will do well to confine his experiments to the produce of the well-known high-class paper-makers such, for instance, as Schleicher & Schüll, Rives, Steinbach, Whatman, Zander, and the "O.W" (old water colour) papers.

We may conveniently group the various platinotype processes into three classes:—

(A) Paper coated with a light sensitive salt of iron (*e.g.*, ferric oxalate) which is exposed to light. This yields a partly visible image (in ferrous oxalate). The paper is now bathed with a solution containing a platinum salt, which deposits (develops) a platinum image. Papers of this kind are sometimes termed "Platinum in the bath papers." Owing to the nature of the developer—which when mixed for use does not keep long—this process proves not so economical as the others and is seldom now used. It is, however, capable of yielding quite as fine results as any other method. Development takes place at normal atmospheric temperatures.

(B) In this group of processes the platinum is mingled with the sensitive iron salt, and the two are applied to the paper in one operation. Similarly a ferrous image is produced by light. Then on applying a solution of potassium oxalate or other suitable substance a platinum image results. The

Snow

and

Sun-

shine.

now filled with water, stirred and the precipitate allowed to subside, the supernatant liquid poured away and the washing repeated until the wash water no longer turns red litmus paper blue. Pure water is poured in to the 42 parts mark. Then 10 parts of pure oxalic acid are added. The mixture is well stirred and should now be quite clear. Water is added to reach the 50 parts mark.

Lead Iron Solution.—In 100 parts water dissolve 20 parts lead acetate, add 4 parts oxalic acid, heat, stir well, collect and wash, dry the precipitate of lead oxalate. Take 100 parts of the ferric oxalate solution, add 1 part of lead oxalate. Shake well and filter.

Sodic Ferric Oxalate.—This salt is obtainable commercially; a 50% solution should be prepared.

Potassium Chloroplatinite Solution.—The strength required is obtained by dissolving 15 grains of the salt in 90 min. of distilled water.

Sodic Platinic Chloride Solution.—Dissolve 15 grains of the yellow crystals in 120 min. water.

Oxalic-gelatine Solution.—In 40 parts water dissolve 4 parts gelatine and add 1 part oxalic acid. (Dissolve by aid of heat).

Mercuric Citrate Solution.—In 20 parts water dissolve 5 parts citric acid and 1 part yellow oxide of mercury.

Mercuric Chloride Solution.—Dissolve 1 part salt in 20 parts water.

Gum Arabic Solution.—Dissolve 1 part gum in 2 parts water.

Sodium Oxalate Solution.—Dissolve 3 parts salt in 100 parts water.

The Light of the Coating Room.—Day-light should be filtered through orange paper, and gas-light through yellow fabric. The sensitising solutions and mixtures should be kept in the dark.

Coating the Paper with the sensitive mixture must be done evenly and expeditiously. The solutions are distributed over the paper by means of brushes. But these must not be made with any metal parts, or spots and streaks will result. The brushes may be of hog hair. If too hard they will cause streaks. The common round string bound

glue brush may be used—or a tuft of cotton wool may be forced into the end of a glass tube. A convenient spreader is formed by bending a sheet of celluloid over a thin flat bit of wood ($4 \times 2 \times \frac{1}{8}$ ins.), covering the celluloid with a piece of swans-down and holding all together with a strong elastic band. The spreader is used like a squeegee. The paper should be an inch larger than a drawing board to which it is fastened by folding down a half-inch strip all the way round, and fixing to the edge of the board with drawing pins. The solution must not come in contact with these metal pins. The surface is lightly rubbed with rapid long strokes, first one way and then in a perpendicular direction until it is *nearly* dry, so as to prevent the formation of crystals or air bubbles.

Drying the Paper is a matter of great importance. The drying should not occupy more than half an hour. This may be done at a temperature of about 130° F.

Sensitising Formulæ. Class A—

	A	B	C	D	
Lead iron solution	25	10	50	25	parts
Mercuric chloride solution	1	—	—	—	,,
Chloroplatinite solution ...	—	1	3	4	,,
Sodic-platinic solution	—	—	4	—	,,

Developers—

(1) Water, 100 parts; potass. phosphate, 5 parts; potass. oxalate, 10 parts. Add just before use 10 parts chloroplatinite solution.

(2) For bright contrast results:—Saturated solution of potass. oxalate, 400 parts; glycerine, 50 parts; chloroplatinite solution, 10 parts.

Sensitising Solutions. Class B.—Black image by hot development—

(1) Chloroplatinite solution ..... 4 parts.
Ferric oxalate ,, ... 5 ,,

(2) For gelatine-sized papers:—
Chloroplatinite solution ..... 4 ,,
Ferric oxalate ,, ... 6 ,,
Oxalic gelatine ,, ... 1 to 2 ,,

Sepia image by hot development—

Chloroplatinite solution ..... 40 parts.
Ferric oxalate ,, ... 60 ,,
Mercuric chloride ,, ... 10 ,,
Sodic-platinic ,, ... 1 part.

Sensitising Solutions. Class B.—Black image by cold development—

	A	B	C
Chloroplatinite solution	6	6	— parts.
Lead iron ,,	9	9	— ,,
Oxalic gelatine ,,	—	2	— ,,
Sodic-ferric ,,	—	—	— ,,

Sepia image by cold development. Preferable to use agar-agar or sizing—

Ferric oxalate solution	80 parts.
Chloroplatinite ,,	40 ,,
Mercuric citrate ,,	20 ,,
Sodic-platinic ,,	1 part.

For increased contrasts the last-named constituent may be doubled.

Sensitising Formulæ. Class C.—The paper is sized with arrowroot, or agar-agar—

Sodic-ferric solution	3 parts.
Chloroplatinite ,,	2 ,,
Water (for rough paper only)	1 part

The following may be applied to paper without preliminary sizing—

Sodic-ferric solution	24 parts.
Chloroplatinite ,,	36 ,,
Gum solution ,,	24 ,,

If increased contrasts are required, 1 to 3 parts of sodic-platinic chloride may be added.

General Notes on the coating solutions.—For rough surface papers more water may be added to the extent of 50 per cent. of the total bulk previous to dilution. Agar-agar sizing favours the production of warm black or sepia toned images. Increasing the sodic-platinic solution tends to increase contrast, and gives brilliant prints. It also helps in the keeping of the paper.

Size-free papers should first be coated with agar-agar, dried, and then re-coated with arrrowroot.

Sizing fabrics, *e.g.*, silk muslin before sensitising :

(1) Arrowroot, 50 grs.; gelatine, 18 grs.; water, 12 ozs.; alum, 10 grs.

(2) Water, 500 parts ; alum, 20 parts ; soluble glass, 20 parts.

After sensitising, stretch the fabric on a light wood frame and dry thoroughly. Print by actinometer, and develop at once after printing.

Fig. 13.

DIRECT PRINT.

Fig. 14. E. T. Holding.

CONTROLLED PRINT.

Chemical Jottings.

By J. J. JOHNSON.

Platinum in a fine state of division is known as platinum black, and this forms the photographic picture. Platinum black has the power or property of condensing oxygen upon the surface, and so forms an oxidizing agent.

Platinum dissolves in aqua regia (3 parts hydrochloric and 1 part nitric acid). If the solution so formed be evaporated to dryness, then re-dissolved in water and again evaporated, we obtain platinic chloride, platinum tetra-chloride, $Pt\ Cl_4$, $5\ H_2O$, a non deliquescent red crystalline salt.

If platinic chloride (tetra chloride), be heated to 250°F, it forms a platinous chloride (di-chloride), a greenish powder insoluble in water. It is soluble in hydrochloric acid, forming a red brown solution known as chloroplatinous acid. Let this be evaporated to dryness over a water bath, and then the solid dissolved in the minimum quantity of water, a quantity of pure potassium chloride, equal in weight to the quantity of metal platinum first dissolved, is taken. This is dissolved in a minimum quantity of hot water, and then added to the chloroplatinous acid. After well mixing, this is slowly evaporated, when red crystals of potassium chloroplatinite separate out. (Potassium chloro-platinate, a yellow crystalline substance, is not to be confused with the platinite).

Reactions or tests for platinum salts :—

1. Sulphuretted hydrogen—a slow forming brown-black precipitate.
2. Ammonia—a yellow crystalline precipitate.
3. Ferrous sulphate saturated solution—a black precipitate on boiling.
4. Add excess of soda carbonate and some grape sugar—boil—a black precipitate is thrown down.

Potassium Chloroplatinite may be prepared as follows :—In 100 parts of distilled water dissolve 50 parts platinic chloride. Bring this solution to boiling point by means of a water bath. Now pass into it a steady stream of washed sulphur dioxide

(sulphurous acid gas). The yellow liquid presently turns red, showing that the required salt has commenced formation, *i.e.*:—the platinum salt is changing from the platinic to the platinous state. From time to time remove a small quantity of the liquid with a pipette, and add strong ammonia. If any platinic salt yet remains unconverted, we shall have a yellow precipitate of ammonium chloro-platinite thrown down. The gas must be passed until conversion is complete, but stopped at that stage, or the platinum will be thrown down as a sulphide. But if insufficient gas has been passed, some platinic salt will remain unconverted, and be thrown out as potassium chloroplatinate in the subsequent operation.

The right stage being reached the vessel is set aside to cool. We now prepare a 50% solution of potassium chloride in hot water. This is added with stirring to the platinum solution, when the desired chloroplatinite of potassium separates as a red precipitate. This is allowed to collect, and washed in a little water, and then in alcohol until it ceases to give an acid reaction.

As the desired salt is soluble in 6 parts of water, it is obvious that as little water should be used as possible, or a serious loss of the precious metal will take place.

Another Method.—Take 9 parts of platinic chloride, and dissolve in 270 parts water; add 1 part potassium hypophosphite. The solution is kept *just below* boiling for several hours, when the solution becomes sufficiently concentrated to crystallise out the salt on cooling.

If the liquid be boiled there is a probability of the reduction having gone too far, and other reactions taking place.

Another Method.—In 300 parts of water dissolve 24 parts potassium platinic chloride, add 12 parts potassium chloride, and 12 parts potassium hydrogen sulphite (bi-sulphite). Boil for 20 minutes, then put in an evaporating dish, when presently the salt separates as red crystals.

Residues.—Waste sensitizing solutions, and "platinum in the bath" developers, are the richest in metal, and therefore most important.

(1).—Make a saturated solution of sodium formate, and add this to any platinum-containing solution, slowly with much stirring, and warm gently, when the precious metal will be precipitated as a black powder, which only requires washing with hot hydrochloric acid to remove any iron, and then washing with hot water.

(2).—To a solution containing platinum add ammonium chloride and potassium chlorate in the proportion of ten parts of the chloride to one of the chlorate. Shake or stir well and set aside for a day or two, when a bright yellow precipitate of ammonium chloroplatinate will separate out. This precipitate should be collected and washed with alcohol. This is collected, dried and heated in a porcelain dish, when white fumes of ammonium chloride pass away, leaving platinum black behind.

(3).—Solutions containing only small quantities of platinum may be healed by suspending in them plates either of zinc or aluminium. The solutions should be slightly acid when the platinum is thrown down as a black powder, or it may adhere to the metal plates. From there it must be brushed off and allowed to settle.

Small particles of zinc are removed by adding more hydrochloric acid.

Copper impurities in the aluminium are removed by hot nitric acid.

(4).—To the developer add one-fourth its volume of a cold saturated solution of ferrous sulphate. Mix and slowly bring to boiling point in a large porcelain evaporating basin. The platinum is thrown down as a black powder. This is collected on a filter and washed by several rinsings of warm water.

Spoiled prints, stale paper, print trimmings, etc., should be collected and burnt separately, and the paper and platinum ash collected. This black powder is placed in a porcelain or glass vessel, and covered with aqua regia (*i.e.*, 3 parts hydrochloric acid plus 1 part nitric acid), well stirred with a glass rod, and then warmed up to about 130°-140°F.

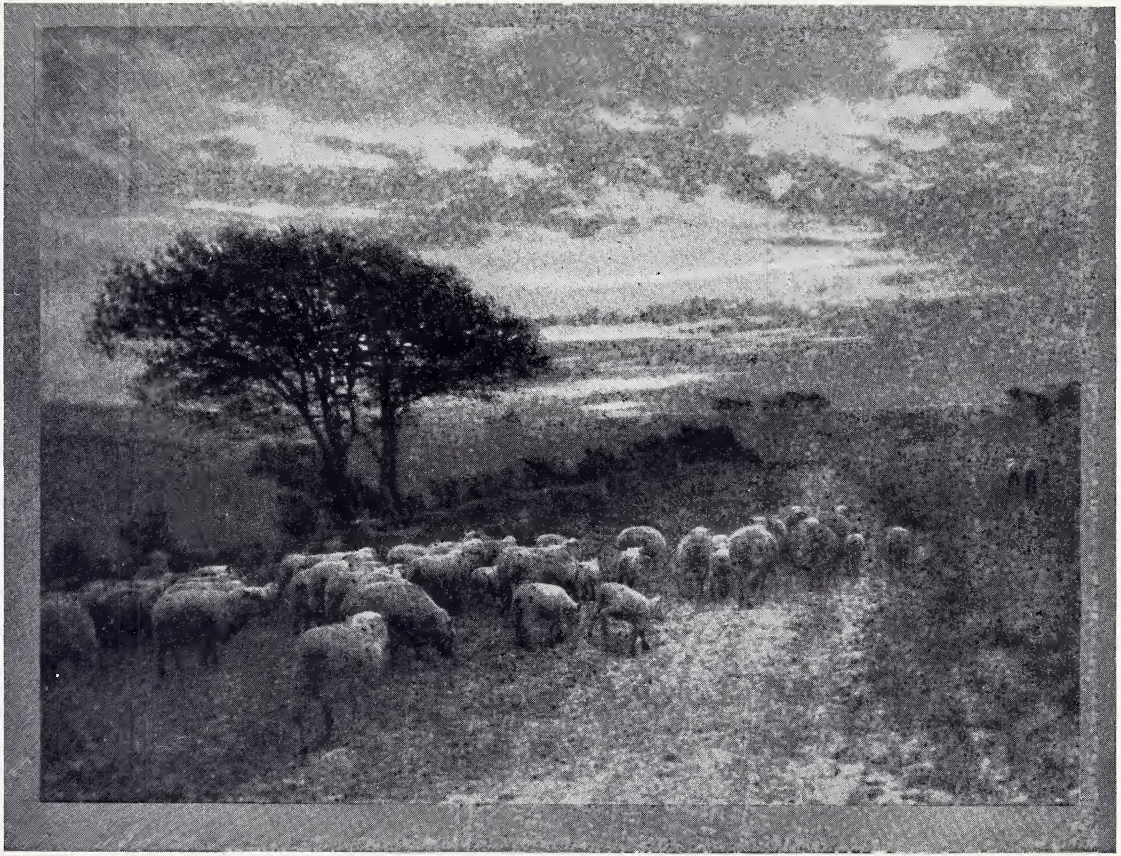
The vessel is now covered with a plate or saucer and left on a warm oven top all night to digest. Next dilute this pastey mixture with 10 or 12 times its volume of water. Stir well, and remove all undissolved matter by filtration. Now add strong ammonia until the mixture smells of ammonia after well stirring. Ammonia chloroplatinite is thrown down. This is collected, dried and heated, when metallic platinum only is left. This residue should be digested with hot hydrchloric acid to remove any iron, and finally washed in plenty of water, when pure platinum black remains.

The Fixing Bath.—Put this in a shallow vessel, *e.g.*, a large dish or tray, and scatter in granulated zinc. The platinum is thrown down as a fine black powder. After stirring at intervals, decant off the clear part. Throw the sediment and undissolved zinc into a deep vessel, *e.g.*, jug, add water, stir well, pick out the bits of zinc, and collect the black powder (platinum) on a filter.

Testing for the Presence of Iron (ferric or ferrous). —To the wash water add a few drops of a ten per cent. solution of potass. ferrocyanide, when a blue precipitate or coloration indicates the presence of iron. Similarly, potass. ferricyanide gives a blue precipitate with ferrous salts and a brown colour with ferric salts.

To Distinguish between Platinum and Bromide (Silver) Prints.—Immerse the print in a saturated solution of mercuric chloride. A platinum print will remain unaltered. An untoned bromide print will bleach and become nearly invisible. A gold-toned bromide print will be made lighter.

Again, a 10 per cent. solution of potassium cyanide will have no effect on a platinum print. An untoned bromide print will be dissolved away. A toned bromide print will be reduced.



THE RETURN OF THE FLOCK.

Faults and Failures.

By F. C. BURTON.

General Fog.—(1) Effect of unsafe light during the coating or drying of the paper. (2) Too high a temperature during drying the paper. (3) The ferric solution has been affected by light, some of the iron being converted from the ferric to the ferrous state. To test this add a trace of potassium ferricyanide (*i.e.*, 1 drop of a 10 per cent. solution) to a small quantity (say 1 dram) of the ferric solution. A blue coloration indicates the presence of a ferrous salt. (4) The paper has been kept too long, or in the presence of damp atmosphere. (5) The paper has been fogged by light after printing and before development. (6) The use of alkaline potassium oxalate in the developer.

Weak Prints.—(1) Printing not carried far enough. (2) Developer too weak or too cold. (3) The negative has not enough density contrast. Weak negatives should be printed under pale yellow glass. (4) The paper has become damp. This is often accompanied by a granular or dusky appearance of the print. (5) The paper has been kept too long. In this case the high-lights are probably degraded.

Washed-out-looking Prints.—(1) The use of developer too cold. (2) The use of a developer that has been kept in *diluted* form for too long time. (3) Using the same developer for too many prints, *i.e.*, when it has become exhausted. (4) The use of a developer that has been exposed for some considerable time to daylight.

Black Comets.—(1) The use of a negative which has been intensified with mercury and not properly washed. (2) Blacklead on the negative in re-touching. (3) Re-touching varnish on the negative. Damp spots on the negative or paper, *i.e.*, due to blowing on the paper, sneezing, rain, etc.

Streaks.—(1) Touching the bottom of the developing dish with the image-bearing surface of the paper during development. (2) Touching the paper with moist fingers.

Black Spots.—(1) Particles of metal in the paper, or from the containing tube. (2) Iron rust falling

on the paper. (3) Use of metal knife in cutting up the paper. (4) Dust particles settling on the paper after coating and during drying. (5) Damp fingers.

The platinum image rubs off the paper.—(1) Paper dried too quickly after coating.

White Spots.—(1) Air-bells clinging to the paper during development. (2) Particles of calcium chloride reaching the surface of the paper. (3) Particles of lime falling from the ceiling on to the paper. (4) Particles of dust on the film. (5) Small crystals of hypo crystallizing out of the film in consequence of imperfect washing after fixing.

Paper is yellow in the high-lights.—(1) The sensitizing solution was alkaline, so forming a basic iron salt in the paper. (2) The paper was bleached or blued with ultramarine which turns yellow from contact with iron salts.

Prints look right when wet, but flat when dry.—(1) Paper insufficiently sized; to remedy, apply varnish, etc. (See page 58, 59). (2) Paper not dried quickly enough after coating. (3) Too much water in the coating mixture.

The prints are too black and white.—Hard contrasts. (1) The negative is too contrasty. (2) The exposure was insufficient. (3) Soft prints from strong contrast negatives may be obtained by printing under green or blue-green glass. (4) The developer was too cold.

Prints show brownish colour, local or general, though printed on black paper. The negative may have been intensified with mercury.

Granularity of the Image.—(1) Use of too cold developer. (2) Stale paper, *i.e.*, affected by damp.

Colour is Rusty Black.—(1) Paper has been affected by damp. (2) Too much acid used in the developer.

Print is Blue Black.—(1) Developer too cold. (2) Developer too dilute.

Shadows are Brown Black.—Solarization due to excessive printing—especially prolonged exposure under clear glass. Use a less concentrated developer, or use it colder. Cover the clear glass parts of negative with matt varnish.

Paper turns Yellow.—(1) Clearing imperfectly done and leaving iron salts in the paper. (2) Use of impure hydrochloric acid for clearing bath. (3) Washing in water contaminated with iron. Immerse yellow-stained prints in a 5 per cent solution of oxalic acid and wash well afterwards.

Prints become Rotten.—Paper easily tearing. (1) Insufficient washing after acid clearing bath.

Ink Stains. — Ordinary writing ink can be removed by a strong solution of oxalic acid. Printer's ink: apply warm spirit of turpentine and blot off with clean rag. When the stain is removed then apply pure alcohol. Anilin inks will usually wash out in running water.

Platinotype Pointers.

BY W. WALTON.

To each ounce of a cold saturated solution of potass. oxalate add 2 grains of copper chloride. This develops a warm black tone. Four grains of mercuric bichloride added to a cold saturated potass. oxalate solution gives a warm black tone.

For over-exposed prints from very strong contrast negatives, first pass the print rapidly through a dish of tepid water and *at once* transfer to a hot developer. This gives a greatly softened effect, but the high-lights of the paper are usually somewhat greyed. This may be useful for certain atmospheric effects.

Floating the paper on the developer, face down of course, gives rather more brilliant prints than the usual method of immersing the print in the solution.

Rough Papers, as a general rule, yield warmer tones than those got by the same treatment with smooth papers.

Negatives.—Flat, weak contrast negatives may be improved by printing under blue glass. Hard negatives should be printed under green glass, and very strong contrast negatives in sunlight under yellow glass.

Warm Sepia colours are obtained by using an old sepia developing bath and adding to it one part of a saturated solution of oxalic acid to ten parts of

the old bath, and use at not less than 160° F. This developer will also give the best results obtainable with stale paper.

Purple Browns may be obtained on sepia papers by using the following developer: Water, 10 ozs.; potass. oxalate, 1 oz.; potass. phosphate, 1 oz.; citric acid, 10 grs. Use at temperature 160°—180° F. By adding 30 grs. mercury bichloride sepia browns are obtainable.

Warm tones by cold development.—Stock solution: 20 ozs. water, 5 ozs. citric acid, 1 oz. yellow mercuric oxide. Warm the mixture, shake well, and filter when cold. This is added in varying quantity to the normal cold developer, according as one requires a warm black or red brown colour.

For prints lacking in contrast add ¼ gr. of potassium nitrite to each ounce of normal developer.

Bright prints from over-soft negatives.—Water, 200 parts; potass. oxalate, 16 parts; ammonium persulphate, 1 part. In extreme cases the persulphate may be increased to 5 parts.

To soften slightly harsh prints.—Hold the print in the steam of a hot developer for a few seconds, *i.e.*, until the paper begins to feel slightly limp. Then develop in hot bath. This gives slightly reduced contrasts and slightly warmer tones.

For very weak contrast negatives print lightly and then intensify with platinum.

After clearing, wash in a dilute solution of washing soda—a bit about the size of a hazel nut in a pint of water is enough to neutralize the acid. By this means the paper is less likely to be injured.

Large prints on thin paper may easily be torn if held by the corners. To avoid this lift them by placing the spread-out fingers well under the print, and remove from the water slowly so that the weight of water on the print may be lessened.

Drying.—Not only does a platinum print look less bright when dry than when wet, but the sepia tones or colours are less vivid, *i.e.*, duller, darker when dry than when wet.

Prints drying dull owing to insufficient sizing of the paper are improved by immersion in a cold saturated solution of alum.

B (Hot). A (Cold).

Fig. 17. E. T. Holding.

DEVELOPED PLATINO PRINT.

Fig. 18. E. T. Holding.

DEVELOPED PLATINO PRINT.

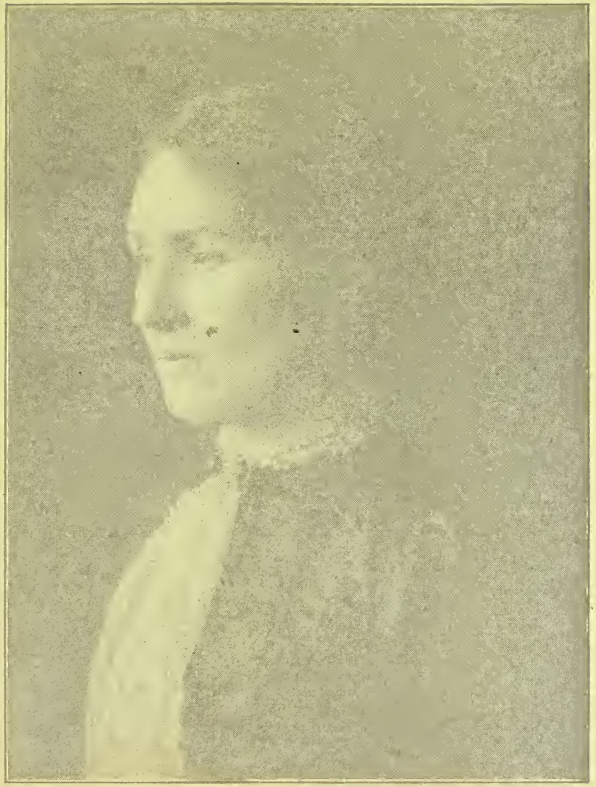


Fig. 19. E. T. Holding.

UNDEVELOPED PLATINUM PRINT.

Fig. 20. F. C. L.

UNDEVELOPED PLATINUM PRINT.

Warmer tones can be obtained by the addition of a small proportion of potass. carbonate to the normal developer.

Hot or Cold Developer.—The following developer may be used for cold, tepid or hot development. Water, 4 ozs., sodium citrate, 1 oz.

How to use Stale Paper.—Prints on damp paper usually show a slight general fog and the image is weak. The remedy is to print somewhat fully and develop with :—

(1) 10 per cent. potass oxalate solution, 8 parts ; 1 per cent. potass chlorate solution, 1 part.
(2) Saturated solution potass oxalate, 1 part ; glycerine, 1 part.
(3) Saturated solution potass oxalate, 20 parts ; potassium hypochlorite, 1 part.
(4) Water, 20 parts ; potass. oxalate, 4 parts ; potassium (*or* sodium) phosphate, 1 part ; sodium chloride, 1 part.
(5) To a normal developer add $\frac{1}{4}$ grain of potassium nitrite (not nitrate) to each ounce of developer.
(6) Normal developer, 20 ounce ; sodium chloride, 1 oz.

Restoring paper fogged by damp.—It is doubtful if this can often be quite successfully done. It should be slowly dried in the dark at 100° F., and kept as close to this temperature during drying as can possibly be done. A higher temperature will induce fog in a quite good paper. The two best developers for papers of this kind are Nos. 5 and 6 on this page.

Paper discoloured by being kept in an atmosphere contaminated with sulphuretted hydrogen can be cleared in the following bath after clearing :— Sodium hypochlorite, 1 part ; water, 20 parts ; add hydrochloric acid just enough to produce a faint smell of chlorine.

Retouching Platinotypes.—Dissolve the coating of a piece of unexposed paper in water. Evaporate and collect the sediment on a soup plate and allow to dry as a thin layer, expose to light, cover with potass. oxalate solution, wash and collect the platinum black. Use this with just, and only just, enough

gum water to make the fine black powder adhere to the paper. Failing this, a bromide retouching pencil will be found very suitable.

To Restore Faded Prints.—The term fading is sometimes—wrongly—applied to prints whereof the paper and not the platinum image has turned slightly yellow in consequence of imperfect removal of the iron salts. In this case "prevention is the best cure." Failing this inapplicable treatment in our case the next best thing to do is to rebleach the paper.

(1) To a pint of water add a teaspoonful of fresh bleaching powder. Stir well and allow the undissolved portion to settle. Decant the clear part for use. Slightly acidulate with hydrochloric acid until the solution has a faint smell of chlorine. Immerse the print until bleached, wash and hang up in sunlight to dry.

(2) To 10 ozs. of hot water add an ounce of soda carbonate and an ounce of bleaching powder. Stir well. When cool decant off the clear part and immerse the print. (The former method is the more expeditious and satisfactory).

Calcium Chloride, for absorbing the moisture of the air in the storage tubes, should be used freely in quantity, and also frequently dried. This may be easily done by roasting the asbestos lumps on a shovel over a red fire or in the oven. These lumps may feel quite dry to the touch, yet when placed on a hot shovel begin to hiss and soften, showing that moisture is present. They should be heated until the hissing ceases and they appear light grey or white in colour. They are now allowed to cool until they can be comfortably handled. Then wrapped up in two or three folds of muslin and restored to the receptacle at the bottom of the storage tin. These lumps should be collected from the tins in which the paper reaches us from the manufacturer. Additional supply can be prepared by making a cold saturated solution of calcium chloride and then adding asbestos fibre until a pastey mass is obtained. This is then made into little balls and roasted over the fire. Or small pieces of pumice stone may be saturated with the calcium chloride solution and then baked dry.

The Principles of Platinotype.

By CHAPMAN JONES, F.R.P.S., F.C.S., F.I.C.

IT is not surprising that when photography was young, platinum should have attracted considerable attention. The metal is less easily acted on than silver and compounds of other metals in which photographic images can be produced, hence it would be expected to give a more stable picture. Gold, which is comparable to platinum in its ability to resist adverse influences, gives feeble images of a reddish or bluish tint, but platinum, when finely divided by chemical means, forms a black powder of very considerable tinctorial power.

These early experiments appear to have been all made with the ordinary chloride of platinum, that is, the one obtained by dissolving the metal in aqua regia, or with analogous compounds, mixed with various substances. Robert Hunt actually tried a mixture of platinic chloride with ferrous oxalate, and prepared various platinotypes.* Although his empirical experiments came near to the necessary conditions, he entirely failed to appreciate the part played by each constituent.

Platinum Compounds. Platinum combines with chlorine in two proportions, and the ordinary chloride contains twice as much chlorine combined with a unit weight of the metal as the lower chloride. When, therefore, chlorine is removed from it, it does not follow that the metal will be deposited; the lower chloride may be produced, and this under the conditions that usually hold is soluble in water. If any image is produced the detail in the high-lights, where the action is slight, is almost certain to be lost, and the result is naturally a hard, chalky and useless print.

The necessity for using the lower chloride, from

* The word "platinotype" was used as early as 1844 to indicate a print made *by means of* platinum compounds. It is a more general and inclusive term than "platinum print," as this indicates that the image *consists of* metallic platinum. Woodburytype, Playertype, stereotype, collotype, etc., may be compared with gold print, pigment print, etc., to make the difference between the two terms more clear.

which no chlorine can be taken without the deposition of an equivalent amount of metal, seems to have been first practically realised by Mr. Willis. But this platinous chloride is a very awkward substance to prepare, and also troublesome to use, for it is hardly soluble in water. Mr. Willis therefore employed its compound with potassium chloride, called potassium platinous chloride, or potassium chloroplatinite. This compound is a very soluble salt of a fine red colour, and as it is easily crystallised it can be easily purified. Perhaps it did not occur to the early investigators to use this substance, because the corresponding salt of the ordinary chloride, although crystallisable, is hardly soluble in water.

Platinum salts, even in the presence of sensitisers, are not usefully sensitive to light, and this is another reason why the early experiments were futile. The production of the platinum image is therefore always a secondary effect, resulting from the product of the action of light on some other substance. The sensitive substance is invariably ferric oxalate, not that this is the only available compound, but it has been found to be practically the best. The sensitive salt and the platinum salt are the only things really necessary in the preparation of platinum paper. As ferric oxalate cannot be crystallised and so obtained of constant composition, it is usual to prepare a solution of it and determine the proportions of its constituents by chemical analysis, and then to adjust them as experience has shown desirable. The prepared solution is mixed with the solution of the platinum salt, and a measured quantity of the mixture is spread over the paper with a pad and dried rather quickly that the liquid may not sink too much into the paper. Platinum paper, as at present prepared in quantity, is coated by machinery.

With paper prepared as just stated it is possible to get very decent prints. But a printing paper is not very likely to be commercially successful unless it will give good results with such negatives as are commonly made. Negatives now are generally thinner and flatter than they used to be, and in order to get a brilliant platinum print from such

Fig. 21. NORTH CHOIR AISLE, ELY. C. Walker.

Fig. 22. DEVELOPED PLATINUM PRINT. F. C. L.

Fig. 23. P.O.P. UNTONED PRINT. F. C. L.

negatives, a small amount of the higher chloride of platinum is added to the coating solution (indirectly by the addition of an oxidising agent), and this has the effect, as already explained, of diminishing the deposit of platinum; it has indeed what is photographically called, a "reducing" effect, and this is especially noticeable in the high-lights where the deposit is slight. The print therefore shows more contrast, and is more vigorous.

The Paper. Of course in the manufacture of the paper there are many practical details that have to be attended to in order to secure a successful result. One of the most important is the quality of the paper itself. The sensitive solution penetrates partly into it, not resting on it or on a substratum as in gelatine, albumen and collodion printing papers, and any impurity that is in the paper will therefore affect the image. A speck of metal—copper, brass, zinc or iron, for example—would precipitate metallic platinum and give a black spot. The fact that an even and good image is obtained is practical proof of the good quality of the paper and of the sizing material used.

Moisture. The prepared paper, as every user of it knows, is kept scrupulously dry. Yet some photographers will say that the dryness is not so necessary as it is made out to be, and that old paper that has not been kept dry is sometimes to be preferred. The fact probably is that those photographers who find occasional advantage in stale paper do not want a good copy of the subject they have photographed, but a toned-down copy with detail suppressed, a print to suit their ideas rather than to represent the original. All sorts of accidents and faults may be welcome under such circumstances.

For good, straightforward work there is no doubt that the paper must be kept dry; otherwise it seems that the iron salt gets a little decomposed, and the paper gives a foggy print. And a foggy print is often a muddy-coloured one, for exactly the same pigment and in the same condition will appear bright or muddy according to the manner of its distribution. For example, the same carbon tissue will give a brilliant print or a muddy print accord-

ing to the negative used ; and although the pigment must be the same in both cases, it is sometimes difficult to believe it.

Action of Light. When paper coated as described is exposed to light the ferric oxalate is decomposed, giving ferrous oxalate, so far as the light has acted upon it. The change of colour is slight, though often a sufficient guide for judging of the duration of the exposure that is desirable. The platinum salt is not changed. Platinum printing is therefore a printing-out process; that is, the full amount of chemical change is produced by the light.

The subsequent "development," as it is called, is not development at all in the sense in which a negative is developed. In development proper the substance that removes chlorine from the silver salt is used in excess, and has to be so adjusted that it will take the chlorine from the salt that has been affected by light but not from the chloride that has not been so changed. The light does not effect the decomposition any more than opening the door will fill a church: it only makes it possible. But the "development" of a platinum print is entirely different. The substance that takes away the chlorine from the platinum is the ferrous oxalate produced by exposure to light. This, in the "development" of the print, produces its full effect and without discrimination. It does not therefore in this case perform the functions of a developer, but is simply, in chemical language, a reducer. The liquid that is called the "developer" simply enables or obliges this ferrous oxalate to act on the platinum salt. The expressions "developer" and "development" must therefore not be in any way associated or confused with the same words when applied to the development of an exposed gelatine plate.

"Development." The only function of the developer in platinum printing is to cause the ferrous oxalate produced by the exposure to reduce the platinum salt, taking away its chlorine and leaving metallic platinum. Ferrous oxalate, which is not soluble in water, easily dissolves in a solution of potassium oxalate, and is always so dissolved when it is to be used as a developer for negatives.

It was natural therefore that a solution of potassium oxalate should have been the first developer used for platinum prints, and it is doubtful whether any substance is superior to it, especially when the development is to be done hot. But experience has shown that it is far from being the only effective substance. Certain alkaline phosphates work well, and it is very usual to employ a mixture of potassium oxalate and phosphate. The difference in the final print, due to the use of different substances for effecting the development, are not great, and are probably due to a difference in the rate with which they act. Water alone gives a very poor result, dissolving away the salts from the paper before the ferrous oxalate has had time to produce its effect, and doubtless the fact that it is not a solvent of ferrous oxalate is a further reason for its ineffectiveness.

Development Hot or Cold. Development may be done either hot or cold. Hot development tends to softness; that is, it gets the full effect of the exposure. The deposition of the platinum takes place so rapidly that none of the ferrous oxalate or platinum salt has time to get washed away. With cold development a part of the exposure effect is lost, and as the loss is more marked in the thin parts of the image—that is, the high-lights—than in the denser parts, cold development tends to brilliancy, hardness, and even under-exposure effects. The difference in colour of the image that results from the temperature of development is referred to afterwards.

As it is only the iron salt, and not the platinum salt, that is affected by exposure to light, it is quite possible to coat the paper with the iron salt only, expose this to light, and to put the platinum salt into the developer. Mr. Willis's first cold-bath process was of this nature, and it yielded very brilliant results; but the greater amount of platinum necessary and other drawbacks have led to this process being superseded.

Fixing. A platinum print requires no "fixing" in the proper sense of this word. After development it only remains to

get rid of the salts that may remain in the paper—in short, to wash them away. But as iron compounds are present, it is better to clear the print first with dilute acid, especially if the water to be used is hard. Practically it is exceedingly important to get the print clean by means of acid, for iron is always difficult to remove from paper, and a little acid facilitates its removal by keeping it in solution.

Printing-out. A printing-out platinum paper—that is, one in which the platinum is deposited during the exposure to light—may be prepared by using a compound of ferric oxalate with an alkaline oxalate in the preparation of the paper, instead of the usual compound of ferric oxalate with oxalic acid. Then the ferrous oxalate produced is in the immediate presence of its solvent, the alkaline oxalate, and it acts on the platinum salt as soon as it is produced, provided the paper is damp enough. But good prints can be so obtained only by accident, for there is no method of ascertaining whether the print is in the proper condition of dampness. It must not be damp to the touch. If the paper is too dry, the print will become darker directly the washing is begun, because the wetting of it will enable the ferrous oxalate to act fully.

The Sepia Image. It is possible to vary the colour of the image in a platinum print within certain limits. As ordinarily produced, especially by cold development, the image is black or grey. Hot development often gives a warmer black. If a minute quantity of mercuric chloride or cupric chloride is added to the solution with which the paper is coated, the colour produced by hot development will be warmer still. This is the principle of the preparation of sepia platinum prints. Now ferrous oxalate (produced by exposure) is a very powerful reducer, and it has been suggested that it may give a reduction product from the mercury or copper salt, and that so the image in these cases does not consist of pure platinum. But this idea is founded on supposition. and can, I think, be easily disproved.

In order to get a warm colour the particles must be in a finer state of division than in the black or

grey state. It is only necessary to raise the temperature of the developer to make a perceptible difference in this direction. The hot solution works more quickly, and perhaps all the particles have not time to coalesce into the black form. When the mercury or copper salt is added, doubtless the deposit is finer still. That neither of these base metals remains in the image is shewn by the following facts. A very minute amount will produce the effect; no reduction product of their salts can exist in the presence of the platinum salt, they at once take chlorine from the platinum salt and give the equivalent of metallic platinum; the resulting compound of mercury or copper is easily soluble in water or weak acid; the sepia image is not affected by chemical reagents as it would be if it contained either mercury or copper or their compounds; and either mercury or copper chloride will give the same colour in the image though their compounds and the metals themselves are of different colours.

By adding mercuric chloride to a hot developer a similar warming of the colour of the image results, but obviously more must be added, as only a small part of the developer comes into contact with the print during development. The mercury salt may be added in reasonable quantity to a developer used cold without producing much effect, presumably because of the slow action of the developer. If a large quantity is added the results become irregular, and probably the image is not pure, for it is liable to change. When a large quantity of the mercury salt is used, it is very likely that there is not sufficient platinum salt in the paper for their reduction products to completely react with, and this probably is the reason of the observed results. If mercury citrate is added in considerable quantity to the solution with which the paper is coated, a satisfactory sepia image is stated to be produced even by cold development, but whether the image so produced consists of pure platinum is open to question.

Presence of Iron. The platinum print when finished consists theoretically of a pure platinum image supported on clean paper. But when a solution of an iron salt is put

upon paper it is practically impossible to wash it thoroughly away. As a matter of fact platinum prints contain a little iron salt or compound associated with the platinum, and the amount of it will vary according to the care with which the print has been prepared. If properly cleared and washed, the amount will be exceedingly minute; if carelessly finished it will still be small but more appreciable. The quantity of iron left in the print by the most careless operator would, I believe, be quite without effect on the permanency of the print. But such a carelessly made print, if subjected to sulphuretted hydrogen, or in general to such circumstances that cause silver prints to fade, will turn to an unpleasant yellowish tint reminding one very much of a faded silver print.

Discoloured Prints. The important point to notice is that this is an effect of the iron, and the platinum is not affected. By treating such a changed print with a bath of weak hydrochloric acid containing a little free chlorine, it is thoroughly restored to its original colour. It will be observed that both the acid and the chlorine are of an attacking or solvent character; they can only remove matter from the image, they cannot add to it. The restoration is, therefore, of exactly the opposite character to any process that may be suitable for the restoration of a faded silver print. The change in the platinum print is due to extraneous matter, and the restoration consists in the removal of it by vigorous reagents. In a faded silver print the silver or the silver compound, that is, the image itself, is affected, and if the changed material were removed there would be little if any image left.

Precautions. It is easy to formulate the directions in which care should be exercised to prevent such a change in a platinum print. The clearing with the acid should be thoroughly done and the subsequent washing not unduly curtailed, but no amount of washing with water will take the place of a thorough clearing with acid. Then the print should be mounted on a decent board, not a board made of any rubbish as

some are, but one that might be fairly used for a silver print. A platinum print so prepared is, I believe, the most permanent of all photographs, not excluding enamels.

Toning. Some people are not satisfied with a simple platinum print, but desire to change its colour. There is only one way of doing this, and that is by adding something to it. Such a production is, therefore, no longer a platinum print, although it might be perhaps called a platinotype print. The image of a platinum print may be added to in two ways, that is, either the platinum itself or the minute residue of iron may be utilized to bring about the addition. The platinum acts in a physical or mechanical way, for there is no method known by which the platinum in a print can be caused to enter into chemical combination with anything, except indeed by such vigorous means as would destroy the paper. But the iron compound acts chemically.

If any solution can be prepared that is on the verge of giving a solid deposit, and if such a solution is put upon a platinum print, the disturbing influence of the metallic platinum will often bring about the deposition, and the solid deposited in any part will be fairly proportional to the quantity of platinum in that part. The deposition of gold by Dolland's process is a case of this kind. Gold can be deposited of either a blue or red colour according to the size of the particles. In Dolland's process the intensified image is of a colder colour, a more blue black, than the original, hence it appears that the gold is in the condition in which it reflects blue light. Silver can be similarly deposited from suitable solutions. The reddish brown uranium ferrocyanide may be deposited from a mixture of a uranium salt and potassium ferricyanide. In this case it is not very clear as to what effects the reduction of the ferricyanide. The light and the paper may be the active agents, for the ferricyanide when exposed to light in the presence of many kinds of organic matter is readily reduced to ferrocyanide.

In the catechu process of toning introduced by Mr. Packham, it is the residual iron compound that

combines with the toning material to produce the added colour. Tannic acid, gallic acid, and such substances give similar results. Any modification of development or subsequent treatment that tends to fix rather more than the usual small quantity of iron compound in the print, will tend to facilitate the toning by such methods.

All prints of a compound nature such as those just referred to, cannot be properly called platinum prints. As a chain is no stronger than its weakest link, their stability is no greater than that of their most changeable constituent. A uranium-toned print will not stand much washing with common water, as this will dissolve away the uranium compound. It may be suggested that a silver print is often toned with gold and is yet called a silver print. But in this case, the added material is less liable to change than the substance of the original image, the print therefore may be better than its name would indicate. But whatever is added to platinum, with the exception perhaps of gold, is much less stable than the platinum itself. In describing such prints, the only unequivocal way is to state just what they are.

Platinotypes as Window Transparencies.—For this purpose a thin paper should be chosen and a fully printed image obtained. The finished print is then rendered translucent by coating back and front with good paper varnish or Canada balsam dissolved in benzole in the proportion of 1 part balsam to 2 parts solvent. The print is allowed to dry and then fastened between two thin sheets of glass by means of gummed tape such as is employed in the making of passe-partouts.

Platinotypes for Decorative Purposes, *e.g.*, wood panels. The wood is coated with size, allowed to dry, and again coated. The print is then fixed to the wood by means of a thin hot coat of pure glue, allowed to dry and then coated with artists' paper varnish.

Fig. 26. DEVELOPED PRINT FROM STRIP NEGATIVE. F. C. L.

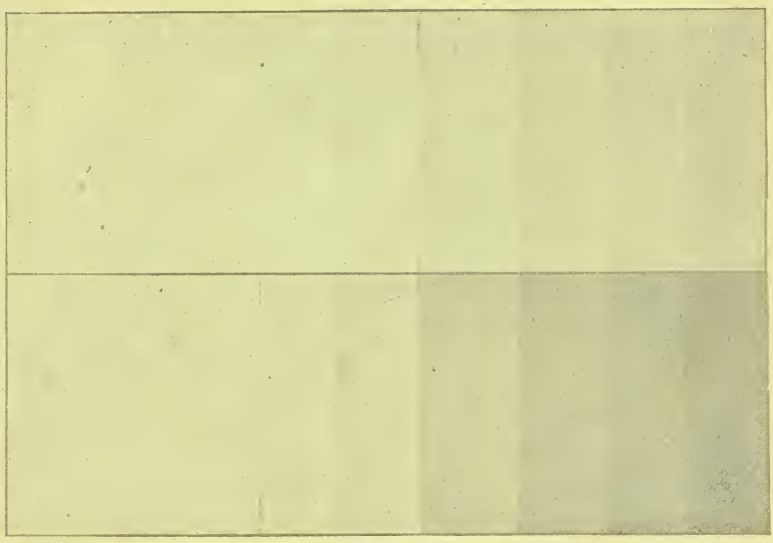
Fig 27. F. C L.

THE TIMBER TEAM.

DEVELOPED PLATINUM PRINT.

UNDEVELOPED PRINT FROM STRIP NEGATIVE.

Fig 28. F. C. L.



A

B

Fig. 29. F. C. L.

THE TIMBER TEAM.

UNDEVELOPED PLATINUM PRINT.

Miscellaneous Hints.

By THE EDITOR.

Reduction.—At present there is no known method of reducing, *i.e.*, dissolving and removing the platinum image of a print without at the same time acting in a harmful if not destructive manner upon the paper.

Intensification.—Platinum prints may be intensified, *i.e.*, added to by various processes. Gold, silver, uranium, etc., may be caused to adhere more or less firmly to the platinum image. This addition is usually accompanied by a change of colour; hence the so-called "toning" of platinum prints. In general it is a condition of success that the print to be treated must have been thoroughly freed from iron salts. Some workers think that a freshly made and washed print tones or intensifies more readily than one which has been dried after washing and before after-treatment. By intensification and subsequent toning, one may obtain a vigorous contrast print from a somewhat weak negative.

Silver Intensification.—Distilled water, 13 ozs.; pyrogallic acid, 10 grs.; glacial acetic acid, 50-60 drops. Flood the print with this for a minute or two, then return to graduate and add 10 or 12 drops of a 10 per cent. solution of silver nitrate. If this does not give the required result a second edition of 10 to 12 drops of silver nitrate solution may be made. By this means silver is deposited on the platinum. This supplementary silver image may subsequently be toned with gold or platinum in the way a P.O.P. or other silver print is toned.

The drawback to this process is the tendency to obtain a somewhat coarse-grained effect. Care is required to avoid staining the paper.

(1) Water, 1 oz.; ferrous sulphate, 5 grs.; acetic acid, 40 drops. Immerse the print for a minute or so, then return to the graduate and add 2 or 3 drops of a 10 per cent. solution of silver nitrate.

(2) A—Water, 1 oz., pyro, 2 grs.; citric acid, 20 grs.; B—Water, 1 oz.; citric acid, 20 grs.; hydrokinone, 2 grs. C—Water, 1 oz.; silver nitrate, 5 grs. Take 25 parts A, 25 parts B, and 1 part C.

Platinum Intensification (Hübl's Process).

(1) Prepare 10 per cent. solutions of sodium formate and platinum bichloride. Take 5 drms. sodium solution, dilute with 12 to 20 ozs. water; add 1 drm. platinum solution. Intensification is somewhat slow. Note that the platinum is added just before the solution is applied to the print, which should have previously been cleared and well washed. Intensification by this process may occupy 10 to 30 minutes according to the degree of dilution, temperature, etc.

(2) Water, 8 oz.; soda formate, 6 grs.; platinum perchloride, 1 gr.

(3) Water, 1 oz.; phosphoric acid, 15 minims; potass. chloroplatinite, 1 gr. Gives warm black tones.

Platinum Intensification (Vogel's Process).—Of a normal ferrous oxalate developer take ½ oz.; dilute with 5 ozs. distilled water. Add 12 to 20 drops of a 10 per cent. solution of potassium chloroplatinite. This is used after the print has been cleared and well washed.

Platinum Intensification (Miethe's Process).—Prepare a cold saturated solution of potass. oxalate (*i.e.*, approx. 33 per cent.); also a 30 per cent. solution of ferrous sulphate in cold water and a 10 per cent. solution of potass. bromide. Take 5 ozs. of oxalate solution; to this add 1 oz. of iron solution (and *not vice-versa*) and add 25 minims bromide solution. Apply this to the print immediately after development and before clearing. Then clear and wash in the usual way.

Gold Intensification (Dolland's Process).—Lay the well-washed print on a sheet of stout glass. Surface dry by laying a sheet of clean blotting paper over it for a few seconds. Now apply an even thin layer of glycerine. Then rapidly brush over the print a 1 per cent. solution of gold chloride. This process is useful for improving dull or rusty prints, but is apt to stain the paper a violet or pink tinge. After intensification the print is well washed and then

immersed in a metol-soda or metol-potash developer (*Vide* pp. 36-37, *Practical Photographer*, No. 6.). Finally it is well washed once more.

(1) Water, 5 oz.; lead nitrate, 35 grs.; amm. sulphocyanide, 100 grs.; gold chloride, 1 gr. Gives a bluish-black tone.

Uranium Toning and Intensification.—(1) Water, 10 oz.; uranium nitrate, 5 gr.; glacial acetic acid, 10 min.; potass. ferricyanide, 5 gr.; ammon. sulphocyanide, 25 gr. After toning wash in acidulated water, *e.g.*, water, 20 oz.; acetic acid, 20 min. This bath yields a range of colours from warm black and chocolate to a sienna red colour. (2) Water, 6 oz.; uranium nitrate or acetate, 6 gr.; potass. ferricyanide, 6 gr.; glacial acetic acid, 3 drm.; soda sulphite, 6 gr. (3) Water, 1 oz.; potass. ferricyanide, 2 gr.; ammon. citrate of iron, 1 gr.; uranium nitrate, 1 gr.; acetic acid, 50 min. Red-black tones.

Iron Toning.—Water, 10 oz.; ammonia iron alum, 4 gr.; hydrochloric acid, 4 min.; potass. ferricyanide, 2 gr.; ammonium sulphocyanide, 20 gr. This yields blue-blacks and blues with a somewhat greenish tendency. (2) Water, 4 oz.; ammonia citrate of iron, 10 gr.; potass. ferricyanide, 10 gr.; nitric acid, 5 drops.

Green Tones after Uranium.—The uranium-toned print is always to be washed in water that is slightly acid or the "tone" will be dissolved away. It may be turned to an olive green colour by a weak solution of chloride of iron—a few grains per oz. The print changes to grey and then to olive green. It is again washed in dilute acid water.

Green or Blue Prints.—Saturated solution of potass. oxalate, 8 parts; ten per cent. solution of potass. ferricyanide, 3 parts; glycerine, 15 parts; water, 30 parts. Apply with a brush after the usual glycerine method described on page 00. At first the prints have a green colour, but this changes to blue in the acid bath. Prolonged immersion in the acid bath should be avoided. (See also uranium toning).

Border Printing—A Further Modification.—In Fig. 3 we show the effect of a modification of the various forms of border printing described at length in No. 1 of the present series of *The Practical Photographer*, pp. 30-33. We may therefore assume the reader to be familiar with these pages. Our first step is to cut out a mark with centre opening showing the picture part. This is put on the glass side of our negative. The part of the mark removed from the centre is attached to a sheet of clear glass placed in register so as to protect the picture while the border is printing. Here comes the modification. Over this centre mark on the clear glass is fixed a second piece of semi-opaque paper, projecting, say, $\frac{1}{8}$ or $\frac{1}{4}$-inch top and sides and $\frac{3}{8}$ or $\frac{1}{2}$ at bottom. After the picture has been printed with surrounding parts protected it is transferred to the second frame. But instead of adjusting it in exact register an overlap of say $\frac{1}{16}$ inch is allowed at the top and one side. On printing the border we get three things at one operation. First, the overlap of $\frac{1}{16}$ at top, and one side is kept *nearly* quite white. Next, a light tint inner border is printed through the semi-transparent white paper. Thirdly, a black outer tint is printed through the clear glass. The nearly white $\frac{1}{16}$ band at top and one side give the suggestion of an embossed mount as in Fig 3. The relative strength of the inner grey and outer black borders can be modified by using papers of various degrees of translucency. That used for the accompanying example was a bit of "white demy" as used by chemists to put round medicine bottles. Care must be taken to select a piece even in grain and free from spots.

Clearing.—Sepia prints if left for a considerable time in the clearing bath are likely to part with some of their pristine warmth of colour and dry a dull warm black. Sepia prints should be cleared in rather weaker strength of acid, *viz.*, water 100 parts, hydrochloric acid 1 part. For ordinary black and white prints the normal proportion is acid 1 part, water 60 parts. Citric acid 1 part, water 20 parts, may be used in place of hydrochloric acid. This has less tendency to destroy or rot the paper. But it involves considerably more cost.

Reflections

Judging Printing.—Correct exposure is of supreme importance for first-class work. After a little practice, with careful observation, the great difficulty experienced by every beginner very soon vanishes. To aid the beginner we have made some examples which will greatly smooth his first steps. A "strip negative" was made by giving successive exposures to different parts. We thus have a series of steps of density ranging from practically clear glass up to a density which would just show a visible tint by the time the clear glass was printed full dark with P.O.P. It therefore represents the density range of a good P.O.P. negative. Putting a piece of platinotye paper in contact, it was printed until we could just see the junction line between the fourth and fifth steps. This presented the appearance of Fig. 28A. A pencil mark was made at this junction.

Half the negative was now covered with a piece of card and printing continued until we could just see the junction line between steps 6 and 7, *vide* Fig. 28B.

The print was then developed, and gave us the result shown in Figs. 28A and 28B. Comparing the developed and undeveloped print, we see that development has in each case brought out just two more strips than we could see in the printing frame. Here then is the key of the whole situation. In printing a negative we must select some one part, which, when just visible, will on development give two more steps of tone. To aid in this judgment it is useful to find some such 3rd density step, which comes close up to the protecting rebate of the printing frame, because we can thus easily see the slightest change of tint of printing when it is next to a strip of unaltered paper. In Fig. 27 we have an ordinary "landscape with figures" subject. In Fig. 29 we have the appearance of the print as it leaves the printing frame, with its clear margin of protected (unaltered) paper all round it.

Cloud Printing.—The general method of cloud printing has been already described in No. 1 and No. 3 of the present series. What has there been said can very readily be adapted to platinum

printing, which in this respect is easier than bromide printing, because we can see our landscape portion more or less clearly. But the difficulty is knowing how far to carry the cloud printing. With bromide printing it is a matter of so many seconds at such a distance from an artificial light. With platinum printing we usually employ daylight, which may vary in quality. Moreover the exposure may be minutes rather than seconds.

In Figs. 20, 22, and 23, we have the result of printing a piece of platinum paper side by side with a piece of P.O.P. When the platinum paper is correctly exposed, Fig. 20, the P.O.P. shows us a picture, Fig. 23, which is just a shade lighter than we desire our finished platinum to resemble Fig. 22.

If now we employ an actinometer the matter is quite simple. We proceed thus. Put a piece of P.O.P. under the cloud negative and at the same time a bit of P.O.P. in our actinometer. Put out both to print side by side. Examine the cloud print from time to time until the picture is just a trifle too light for finished results. Then withdraw the actinometer and note the highest number visible. Suppose this to be 5. Now in one corner of our cloud negative write with pencil P. 5. Then to print this cloud negative in platinum at any time we have only to expose it along with P.O.P. in our actinometer until we can again just read the fig. 5. By this time our platinum cloud will be correctly exposed and ready for developing.

Thus we see that although an actinometer is not absolutely essential, yet it is a great help in platinum, carbon, gum bichromate, and other like processes wherein the image is but partially visible.

Some workers instead of using an actinometer place a narrow strip of P.O.P. along the edge of the negative and judge printing by watching this strip. This plan serves only when a part of the negative is being used for the platinum print.

Printing in direct sunlight gives less contrast, *i.e.* flatter prints than printing in diffused light.

Yellow negatives may be made to yield brilliant prints by covering the printing frame with blue-green glass or blue sheet-gelatine.

Thin blue-grey or blue-black negatives will

similarly give more plucky results if they are printed under pale yellow glass.

Over-exposed prints should be developed on a normal developer diluted with 3 to 6 times its volume of water.

Printing may be done by means of electric arc light or magnesium burnt in oxygen. But as these means are not usually employed by the amateur they are not discussed in detail.

Enlarging onto platinum has also been done by electric light by a solar enlarging camera, but here again these methods do not usually fall in with amateur procedure.

Control Modifications.—Hot bath paper, after exposure, may be allowed to become slightly damp by absorbing moisture from the air. This tends to lengthen the scale of tones, and at the same time changes the ordinary black image to a slightly warm black colour. These effects are assisted by the use of a rather cool developer, say 90-100°F., and by the addition of an equal quantity of water to the normal oxalate solution, and the addition of enough oxalic acid to show a marked acid reaction. The print should be fully but not excessively exposed. To counteract a tendency to general fog, a small quantity of potassium chloride may be added, thus:

Saturated solution potass. oxalate.....	3 parts
Water	3 ,,
Saturated solution oxalic acid	1 ,,
,, ,, potass. chloride ...	$\frac{1}{10}$-$\frac{1}{20}$,,

This procedure is useful for dense strong contrast negatives.

For normal conditions—*i.e.*, developing the paper while dry and at once after printing, the contrasts may be reduced—*i.e.*, a flat print obtained by the use of a normal oxalate developer strongly acidified with oxalic acid.

Sepia paper will usually be found to vary somewhat in colour with the nature and temperature of the developer. Thus raising the temperature or increasing the proportion of oxalic acid tends to yield warmer colours.

The presence of damp in the paper also affects the contrast range. Thus a damp paper gives reduced contrasts and is suitable for dense nega-

tives, while a dry paper gives brighter results from thin and weak negatives.

Sepia paper does not seem to keep in good condition quite so long as the ordinary (black and white) paper.

Control of Contrast.—If a negative yields too strong contrasts, as often is the case with architectural interiors, this contrast may be reduced by a preliminary and brief treatment of the print in a dilute alkaline bath.

A ten grain per ounce solution of ordinary washing soda is prepared in one dish, while the normal developer is at hand in a second dish. The fully printed proof is taken from the printing frame and floated for 5, 10 or 20 seconds on the soda bath, and then transferred to the normal developer. The length of time on the soda bath depends upon the degree of contrast required. If longer on the alkaline solution (within reasonable limits) the greater the degree of contrast reduction. This alkaline treatment, of course, has the effect of slightly warming the tone or colour of image. It is also claimed that it prevents bronzing of the shadows, due to solarisation.

Local Development by the glycerine method.—Workers of small size prints will find penny egg cups convenient. For larger sizes, small jam pots may be used.

Any brushes used should not be bound in metal. "Dabbers" in quill are convenient. Useful brushes for this purpose can be easily made by tying a tuft of cotton wool to the end of a short glass rod, using a few turns of white cotton for this purpose. Four cups are convenient. The first contains normal developer; the second, equal parts of developer and glycerine; the third, glycerine 10 parts, developer 1 part; the last, pure glycerine.

Development should be carried on in plenty of light of a safe kind. This may be gas or lamp light. If daylight be used, the entire window should be covered by an orange paper screen in a light wooden frame fitting the window frame, and held by turn-buttons at each side. A sheet of stout glass is required, of size an inch or so larger than the print (thus for a 5×4 print the glass may

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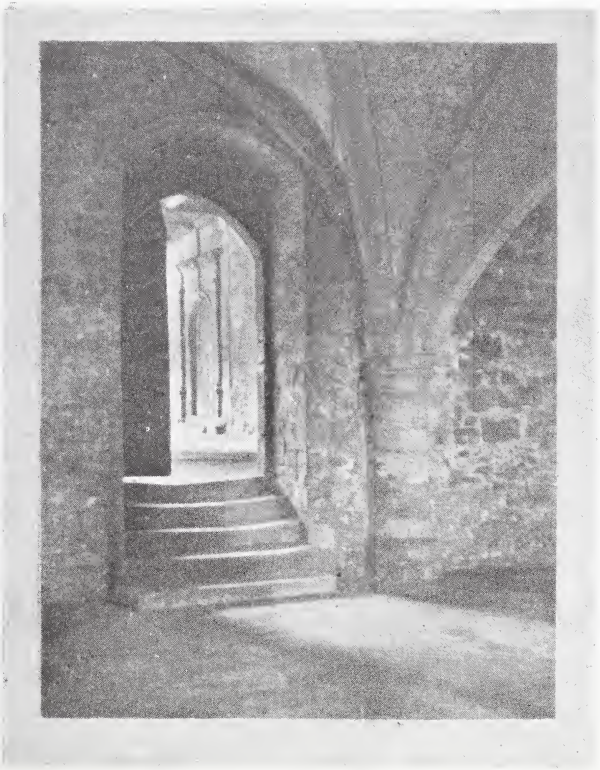

Fig. 32. W. G. Hill.

THE CRYPT, DURHAM.

Fig. 33. F. Whitaker.

FIRE-LIGHT STUDY.

conveniently be 7 × 6). This glass is lightly smeared over with glycerine. The print laid (back down) adheres to the glycerine. Then with a brush or wool tuft the face of the print is thinly and evenly coated with glycerine and allowed to penetrate the paper for a few minutes. Then the unabsorbed glycerine is removed by laying a sheet of blotting paper over the print and lightly pressing into contact. Next those parts of the print that are to be developed are coated with the third mixture (10 to 1). Presently this brings out a faint image. We now apply to the parts next darker the second mixture, *i.e.*, equal parts glycerine and developer. If this does not bring the darker parts sufficiently strong, then recourse must be had to the pure developer, applied to those parts which require most development.

Before applying any one mixture after another over the same part of the print, it is well to remove the first mixture with blotting paper. But where soft edges are required—*e.g.*, clouds, etc.—the two may be blended on the print.

Brush development calls for very light handling, lest the surface of the print be damaged by abrasion.

The more glycerine in the mixture the slower the developer acts. Therefore, some judgment as to rate of action must be exercised. One should bear in mind the simile of a race in which the slower runners are started at such intervals that all may arrive at the goal post together.

After development the print is fixed or cleared in the usual way, but as the pores of the paper are saturated with glycerine, a little extra time must be allowed for the clearing baths to do their work. About ten minutes in each of the three clearing baths will be a suitable time with the usual precautions as to allowing plenty of clearing bath and guarding against any two prints being in contact.

In Fig. 10 we have an example of brush development. On our left we have the effect of a softened edge obtained by constant attention with a mixture containing plenty of glycerine. On our right is a sharp edge obtained by fairly strong developer to a print whereof the surface had been partly dried

by blotting paper after the application of glycerine. Each method has its use at times.

Local Development by the glycerine and brush method may be used with those developers that give a control of tone or colour. Thus the face of a portrait may be developed a warm tone by means of a mercurial developer, while the drapery of the figure or background may be developed with potass. oxalate only, and so obtain a cold black colour.

Surface Treatment.—This may be local or general; *i.e.*, a part, or the whole print. To deal with general treatment first.

(a). Cold water, 1 oz., Gelatine, 20 grains. Soak for an hour or so, then gently warm the containing vessel until the gelatine is thoroughly melted. Soak the dry print in this for a few minutes. Remove, drain, and pin up to dry. This will slightly brighten the print and impart a certain degree of gloss.

(b). In place of gelatine use dried size or isinglass.

(c). Artists' liquid size diluted with two or three times its bulk of warm water, may be applied with a flat soft brush.

(d). One ounce of gum arabic in four ounces of water may be applied in the same way.

(e). Artists' Fixatif may be applied with a spray or diffuser.

(f). Artists' meguilp may be brushed on the print.

(g). Mastic varnish, 1 part, alcohol, 8 to 10 parts.

(h). White wax, 1 dram, gum elemi, 1 dram; melt together in a cup, stir well and add 5 drops oil of spike or lavender. Then add slowly, stirring well, 2 drams alcohol, and 1 dram benzole. This forms an encaustic paste which is lightly applied to the print with a tuft of clean cotton wool, and then gently rubbed into the paper.

Others have recommended Soehnée varnish, crystal varnish, white spirit varnish, vaseline, etc.

Obviously several of the above preparations may be applied locally with a brush.

Another plan to brighten certain parts of small prints is by burnishing from the back. Holding up the print to the light, trace on the back with a pencil the part to be brightened. Now lay the print face down on a sheet of stout glass. Cover the back of the print with a thin sheet of transparent celluloid, *e.g.*, an old film, then with an agate burnisher or end of bone tooth brush handle, rub the part within the pencil outline. As this flattens the paper and converts a rough into a smoother surface by enforced contact with the glass the part is brightened.

Glossy Platinotypes.—For certain scientific and other purposes, it is desirable to show all minute details. The following procedure is quite simple in practice. Make a solution of gelatine of strength 10 to 12 grains per oz. of water, and keep this just luke-warm. Soak the prints in this for some little time. Meanwhile clean a sheet of plate glass very thoroughly. Dry it and dust it with powdered talc, then polish with a dry silk duster. Now coat this glass with enamel collodion. As soon as the collodion is "set," then wash under a *gentle* stream of water until the surface loses its greasy appearance. Now immerse the coated plate in the dish of gelatine solution. Bring a print face down onto the collodion surface; withdraw glass and print in contact. Drain, and pass a roller squeegee over the print to expel all air bells, and obtain good contact; then set up to dry. When *quite* dry, the point of a knife is inserted under one corner of the print, when it will then readily leave the glass with an enamelled surface.

Points to observe carefully.

(a). The glass must be free from scratches and quite clean.

(b). Dust the talc powder freely on to the glass, and use a light circular motion in polishing. An old *silk* handkerchief is excellent for this purpose.

(c). Do not attempt to strip until the print is *thoroughly* dry.

Enamel Collodion.—Pyroxyline, 10 grs.; alcohol, 1 oz.; ether, 1 oz. Keep well corked and away from any naked light (gas flame, etc.).

Temperature of Development.—With cold bath paper this may range from 50°F. to 150°F. At 50° the colour or tone is a cold grey-black tending towards blue. With the higher temperature the colour is a warm black tending towards brown. In general, cold bath paper is best treated between 60°-70°F. The hot bath paper *may* range from 80° or 90° to 200°. But the most useful temperature is 120°-150°F. Under-exposure may be slightly compensated for by raising the temperature of the developer.

An over-exposed print is best developed by a brief immersion in or floating on the developer. This brief development gives cool grey colours with black paper.

Mercurial Developer for warm tones.

(1) Water, 1 oz.; potass. oxalate, 65 grs.; mercuric chloride, 6 grs.; potass. citrate, 10 grs.; citric acid, 16 grs.

(2) Water, 4 ozs.; potass. oxalate, 300 grs.; potass. citrate, 45 grs.; citric acid, 70 grs.; mercuric chloride, 25 grs.

(3) A. Water, 15 ozs.; potass. oxalate, 2 ozs.
B. Water, 15 ozs.; potass. citrate, 3 drms.; citric acid, ½ oz.; mercuric chloride, 100 grs.

For a warm sepia use equal parts of A and B.

For warmer tones increase the relative proportion of B to A.

These developers should be used freshly made or kept in the dark, for a precipitate is likely to be thrown down. This should not be removed from the stock bottle. No. (3) or preferably (1) may be used. But in either case to each ounce of developer add ½ to 1 dram of a saturated solution of oxalic acid.

Developer for warm tones.

(4) Water, 20 ozs.; potass. oxalate, 2 ozs.; potass. phosphate, ½ oz.; potass. chloride, 1½ drms.; citric acid, 3 drms.; mercuric chloride, 2½ grs. Use at temperature 170°—180° F.

(5) Water, 16 ozs.; potass. oxalate, 3 ozs.; copper chloride, 62 grs.; mercuric chloride, 2 drams; lead acetate, 8 grs.

MORNING IN THE WOODS.

Heat until the precipitate is dissolved. Use at 175° F. After fixing and washing rinse in dilute ammonia.

The addition of a small quantity of chlorate of potassium to a normal potassium oxalate developer increases contrasts in the print. This effect is more marked with cold than with hot development. The addition of a small quantity of soda carbonate tends to give slightly warmer colours.

Developer.

(1) Water, 1000 parts (10 ozs.); potass. oxalate, 100 parts (1 oz.); potass. or soda phosphate, 50 parts ($\frac{1}{2}$ oz.).

(2) To increase contrast, take of normal developer 100 parts, and add 1 to 5 parts of a one per cent. solution of potass. bichromate. Thus of normal developer take 20 ozs. and add from 1 to 5 grs. of potass. bichromate.

(3) A cold saturated solution of potass. oxalate (roughly 1 in 3) may be used or the saturated solution may be diluted with an equal volume of water.

(4) Water, 240 parts; potass. oxalate, 32 parts; potass. phosphate, 8 parts; potass. sulphate, 1 part. It is claimed for this developer that it will give a vigorous print from a flat negative if it be printed in a subdued light.

Print-out Process. The paper should be *very* slightly damp before placing in the printing frame. But it must not be too damp or the image will be lost in fog before the details are printed. Pin the paper to the inside of the lid of a cardboard box in which is placed a saucer of water at 100° F. In one or two minutes the paper will be sufficiently damp. Printing may be done in full sunlight and takes a considerable time. The image should be right out as there is little or no loss in the subsequent operation which consists of holding in the steam of boiling water from a kettle. It is then passed through two acid baths of hydrochloric acid of the usual strength. Negatives for this process should previously be varnished.

Dampness in the atmosphere in which the paper is handled or kept has a marked influence on the print. It causes a loss of sensitiveness, inducing general fog. This greys both the high-lights and shadows, thus altering the scale at both ends. For the most brilliant results freshly-made paper, taken direct from the sealed tube, should be used, the negative, printing frame and pressure pad well dried. The print should be developed as soon as possible after printing.

In place of the usual rubber sheet placed behind the platinum paper in the printing frame, we may use a piece of American cloth, or an old film negative or sheet of celluloid or a couple of layers of waterproof paper such as is used in the office copying press, or waxed tissue paper, or oil silk.

To Clean Platinotype Prints.—Prints on unglazed paper of rough surface are apt to become soiled and degraded by dust particles collecting in the depressions of the paper. Stretch a sheet of fine muslin over the mouth of a tub or bucket. Lay the print face down on the muslin. Pour hot water from a jug over the back of the print. Or, dissolve a pinch of alum in a cupful of cold water. Then add household flour enough to make a sticky paste. Lay the print face upwards on a sheet of glass, apply the paste to the surface with a soft brush and spread it well with the fingers. Then wash off under a gentle spray of cold water. The sticky paste carries away the dust and dirt along with it. (Both the above methods are applicable to the cleaning of engravings, etchings, etc.).

Mellowing or Tinting Prints.—Platinotype prints may often be improved by slightly tinting the paper to a colour approaching that of a mellow old engraving; *(a)* a strong infusion of tea, or *(b)* coffee may be used; *(c)* dipping in a 1% solution of potass. bichromate, rinsing lightly, dry, and exposing to light, imparts a pale yellow brown tinge to the paper.

Infusions of tea or coffee are better used freshly made, but may be kept for some time if a few grains of salicylic acid be added.

Packham's Toning Process. — Stock solution : Water, 5 ozs. ; catechu (or "Cutch") 120 grs. Boil in glass or porcelain vessel for about five minutes. Allow to cool. Add 1 oz. alcohol.

Toning Bath : Stock solution, 20-30 min. ; water, 20 ozs. Heat to 130°-150° F. Toning takes about ¼ hour at this temperature. If used at 65° or 70°, the process may occupy two or three hours.

If the high-lights become stained, immerse in water, 6 ozs., soda carbonate, 1 drm., castile soap, ½ drm.

The best kind of catechu for this purpose is known as "Bombay" or "Bengal" Cutch. Price about 1/- per lb.

The presence of a trace of iron seems to favour this process. Prints that have been thoroughly cleared are toned in this bath with some difficulty.

The following developer is said to produce prints which tone readily by this process : Water, 15 ozs. ; potass. oxalate, 7 ozs. Dissolve by heating and add pure West Indian sugar, 3 drms. Develop prints at 120° F. Prints toned by this process are said to slowly fade if exposed to strong day-light. (It is also said that soap, soda, or sunshine will cause fading of the tone obtained by this process.) If such prints turn green, it is probably the result of the use of an acid mountant. The colour can be restored by the use of a very weak solution of soda carbonate. A dilute acid bath will remove a considerable portion of the tone or colour added by this process, but this seems to return again if the prints are passed through the soap bath.

The bath during use will probably become discoloured. This may to some extent be avoided by adding to it 2 grains of castile soap or a like quantity of potass. oxalate. But these additions give also a warmer colour.

For this process a fully-exposed and well-developed print is desirable as the subsequent change of colour tends to make the print seem somewhat lighter than before.

Mallman's Silver-Platinum Process.—(A) Take 1 part arrowroot, rub with 10 parts water in a mortar to a smooth cream, add 75 parts boiling water, then add 15 parts ferric oxalate. Stir well and filter through muslin while yet warm. This solution is light sensitive, and should be prepared by feeble gas-light. (B) Silver nitrate, 1 part; water, 6 parts.

Take 4 parts A and add 1 part B, and evenly coat the paper. A 30 × 20 sheet will take about 1 drm. of mixture; dry quickly over a gas stove protected by a sheet of iron. Print in the usual way as though the paper were ordinary platinotype. Prepare the developer thus:—

(C) Water, 6 parts; potass. oxalate, 1 part.

(D) Water, 100 parts; potass. bichromate, 2 parts.

(E) Nitric acid pure.

For normal contrasts add 2 or 3 drops of D to each ounce of C.

For weak contrast negatives take 2 drops of nitric acid per oz. C.

The picture comes up quickly, and is of a red-brown colour. The print is then washed in dilute nitric acid, 2 drops acid per oz. water. The print is then platinum-toned in water, 4 ozs., strong nitric acid, 4 drops, potass. chloroplatinite, 3 grs. This changes the image from brown to black.

The print is fixed in an acid hypo-fixing bath, well-washed and dried. This process is cheaper than the ordinary platinum printing methods.

This is not properly a *platinum printing* process, but really a silver printing process designed for platinum replacement by toning.

This process is here mentioned as a link which connects direct platinum *printing* with platinum *toning* processes.

Caution.—To prevent a gas flame breaking a porcelain dish, interpose a twopenny asbestos stove mat.

Home-Made Platinum Paper.

THE growing popularity of platinum paper has resulted in a great sale of this, the finest of all simple printing materials, but the high cost of the salts of platinum makes the cost necessarily high, and many amateurs hesitate to use it as much as they would like, especially if they are in the habit of making many pictures to give away. This difficulty will in a measure disappear if one makes one's own paper, and this is not such a hard task as popularly supposed. Of course, some precautions must be observed, but any ordinarily careful person will have no difficulty in successfully making platinum paper by following the directions about to be given.

The platinum process may be divided into two classes, the direct-printing paper, or Pizzighellitype, and the developing paper. We propose to consider this time the Pizzighellitype, leaving the developing paper for a future occasion. This is the simplest process in the hands of the beginner, and has the advantage over the commercial papers that the image is printed completely out, and hence here is none of the ordinary difficulty in determining exactly when the printing is completed.

We may use any unruled paper of good quality, such as linen ledger, the best grades of writing papers, or any of the drawing papers. In order to prevent the image from the possibility of sinking into the paper, and thus producing flat picture, we must size the paper before sensitizing it. For this purpose we take one dram of arrowroot and rub to a paste with a little water and then stir in eight ounces boiling water, continuing the stirring until a clear solution with no lumps is obtained. Bring the mixture to a boil, if necessary, to effect this result, and then coat the paper while the solution is hot. The paper, previously cut to pieces of the required size, is fastened on a clean board with thumb tacks and the hot solution spread on it with a sponge. It is then gone over with a wide brush or tuft of cotton in both directions in order to equalize the coating, and hung up to dry.

For sensitizing, one prepares the three following solutions:

No. 1.	Potassium chlorplatinite	30 gr.
	Pure water	3 dr. 20 m.
No. 2.	Sodium ferric oxalate	5 dr. 8 gr.
	Pure water	11 dr. 20 m.
No. 3.	Potassium bichromate	5 gr.
	Pure water	1 oz.

Solution No. 2 must be kept in a dark-colored bottle in a dark place. It is best to use distilled water for making these solutions if there is any doubt as to the purity of the tap water. For black tones with normal negatives mix of No. 1 one dram; No. 2, one and one-half drams; pure water, one-quarter dram; and No. 3, two drops. For very rough paper, twice as much water may be used. Thin negatives require the use of more of solution No. 3, up to even ten drops, while with very contrasty negatives No. 3 may be entirely omitted.

The previously sized and thoroughly dried paper is fastened on a clean board, and the mixed solutions are spread with a soft bristle brush, which should contain no metal in the fastening. The coating must be done by yellow light or lamplight; then an equalizing brush must be used and the whole surface gone over both ways to make sure that the paper is evenly covered. By the time this is done the paper will appear only slightly moist, and it must now be dried quickly by artificial heat, as a stove or hot-air register. This drying should consume not more than fifteen minutes at the utmost, and if not done in this time good results will not be obtained. In the summer, when artificial heat is not much used, recourse may be had to the oven of the cook-stove, or a drying chamber may be constructed by putting a piece of sheet iron in place of the bottom of a packing case and suspending the paper from wires inside. Heat is furnished by a gas flame or lamp under the bottom, and if the oven is got well heated before the paper is put in, it will dry promptly. The temperature of drying should not be above 125 degrees F.

When the paper is once thoroughly dry it will keep a very long time if protected from moisture, and for this purpose it must be kept in a well-closed tin box, in which is also placed a lump of fused calcium chloride well wrapped in paper to keep the chemical from coming in contact with the paper. It is preferable not to coat more paper than is

to be used promptly, as the results are somewhat better with fresh paper.

In printing the paper some moisture is necessary, and about fifteen minutes before use it should be laid in a damp place or placed in a box in the bottom of which is a saucer of water. It will become somewhat limp, and is then in condition to print. Of course, when it is once dampened it must be used, as if not it becomes useless. The paper is considerably less sensitive than the developing paper, and can consequently be printed in direct sunlight with a moderately strong negative with good results. Thin negatives must be printed in the shade, as with the developing paper. Printing is continued until the picture has arrived at the desired tone. The platinum is reduced on the paper if sufficient moisture is present, and the action is completed at once, so that no developing bath is necessary. If the air is very dry printing is continued only until all the details are out, and the picture is then held for some time in the steam of a tea-kettle. Pictures which are under-developed may often be saved by development in a 1.20 potassium oxalate solution.

The fully printed or developed picture is now brought into an acid bath for fixing. This consists of one ounce of hydrochloric acid in eighty ounces of water. The print is left in this bath three to five minutes and then washed thoroughly for twenty minutes in several changes of water. Hang up to dry, or lay out on pure, clean filter or blotting paper.

The platinum process is not adapted for printing pictures in which the reproduction of minute details is essential, nor those in which there is an excessive amount of shadow; but for ordinary, well-modulated negatives it gives results which are comparable to copperplate engravings for beauty.

Bibliography of Books on Platinotype Printing

ABNEY, SIR W. DE W., and CLARK, LYONEL. **Platinotype: Its Preparation and Manipulation.** 4¾ x 7¼ in.; pp. 196 and index; diagrams. 1898. Paper, **$1.25.**

English. An exhaustive and authoritative description of platinotype processes and the making and manipulation of platinum papers. The most comprehensive work available in English.

CLARK, LYONEL. **Platinum Toning.** 4¾ x 7 in.; pp. 96. 1900. Cloth boards, **50 cents.**

English. This work deals with the toning of plain silver prints with platinum, as practiced prior to the introduction of modern print-out papers.

HINTON, A. HORSLEY. **Platinotype Printing.** 4¾ x 7 in.; pp. 92; frontispiece showing platinotype print before and after development. 1901. Cloth boards, **50 cents.**

English. Deals with the subject from the pictorial point of view, but gives practical detail where required.

PHOTO-MINIATURE, THE, NO. 7. **Platinotype Processes.** 1899. Paper, **25 cents.**

The different varieties of platinum paper. Hot and cold bath processes. Practical manipulation; toning platinum prints to sepia, red, brown, blue, etc Glycerine development, etc. With special frontispiece, showing a print before and after development.

PHOTO-MINIATURE, THE, NO. 40. **Platinotype Modifications.** 1902. Paper, **25 cents.**

Describing, with abundant formulæ, all the reliable ways of obtaining platinotypes in various colors, glycerine development, uranium toning, gum platinotype, etc., with many examples in facsimile colors.

STIEGLITZ and KEILEY. **The "Camera Notes" Improved Glycerine Process for the Development of Platinum Prints.** 7¾ x 11 in.; pp. 12. Illustrated with reproductions in color of prints by the experimenters. Paper, **$1.00.**

An illustrated monograph reprinted from "Camera Notes," Vol. III., No. 4, noteworthy as the clearest and most satisfactory description of the glycerine method of developing platinotypes, with facsimile examples showing the results secured.

WARREN, W. J. **The Platinotype Process.** 4¾ x 7 in.; pp. 85 and index; frontispiece showing platinotype print before and after development. 1898. Canvas boards, **50 cents.**

English. A plain, unvarnished account of the making of platinum prints.

Periodical Articles.

PERKINS, T. **Hints on Brush Development of Platinum Prints.** *Scientific American Supplement.* 1898. 45: 18,643.

Printing-out Platinotype Process. *Scientific American Supplement.* 1897. 44: 18,208.

Reinforcing Platinum Prints. *Scientific American.* 1900. 82: 21.

The above publications may be procured through

Photo Era Publishing Company

170 Summer Street, Boston, Mass.

Notes and News.

The following directions for using Eastman's Sepia Paper may be of use to our readers using this form of platinum paper:

Eastman paper is about three times as rapid as blue paper. It should be under rather than over printed, and is developed by washing in plain water. After two or three changes of water, fix five minutes in a solution of hypo, one and one-half grains to the ounce of water, and afterwards wash thoroughly. If not convenient to weigh the hypo, use as much as can be piled on a ten-cent piece (six grains) with four ounces of water. To secure brilliant prints, paper should be washed immediately after printing. "Immediately" does not mean "in the course of ten or fifteen minutes," but "*at once*," as the action of the atmosphere, depending somewhat on the degree of humidity, will give the prints a flat and "mealy" look. The best method is to place in a waiting tray of water as soon as the paper is taken from the printing frame. Short fixing gives red tones; longer fixing produces a brown tone.

"The Elect," a postal photo art club, have just favored us with a Catalogue of their first exhibit. From it we learn that they were organized in May, 1903, and their first exhibit was held at Bay View, Michigan, during July and August, 1904, under the auspices of the Bay View University. The membership comprises some well-known names in photographic circles, but is apparently limited to ten. Yet what they lack in numbers they certainly make up in quality, as the work shown in their first exhibit is distinctly above the average and bids fair to lead in this special line of photographic endeavor. We count it a privilege to have been favored with this Catalogue, and extend our best wishes for the future progress and success of "*The Elect.*"

The Tenth Annual Convention of the Photographers' Association of Kansas will be held at Topeka September 20–22, inclusive. The officers are Samuel Hirst, president; P. Colville, J. C. Kautz, vice-presidents; B. G. Grondel, treasurer, and P. A. Miller, secretary. After the Convention they will leave on a special train, in a body, for the World's Fair at St. Louis. They will hold a Banquet at Topeka on September 20.

THE Eighth Annual Convention of the Photographers' Association of New England was held in the Mechanics' Building, Boston, August 24 to 26, inclusive. There were addresses by Professor Griffith, of Detroit, Professor Poore, of New York, and Mr. I. Scandlin, of Brooklyn, and a review of the Art Exhibit by Professor F. A. Bement, of New York. The attendance was large, and the general feeling expressed was one of satisfaction with the Convention. The newly-elected president, Chris. Johnson of Hartford, is widely and favorably known throughout New England, having already served in the capacity of vice-president of the Association some years ago.

THE regard which the Japanese have for American integrity cannot be better illustrated than by this story told by a traveler: There is a duty in Japan on photographic cameras, and this traveler was called upon to pay the stipulated sum.

"I have no Japanese money," he faltered. "I must leave my camera here and call again." "Not at all," replied the official, courteously, "I will lend you the money." The traveler, accustomed only to the civilities of the New York Custom House, states that he came near fainting away. At last he gathered strength to ask: "But what security have you that I will repay you?" "Ah," replied the officer, smiling, "you are an American."—*Ex.*

GEORGE H. KETCHAM, of Toledo, Ohio, has offered a prize for the best photographic suggestion for a theatre curtain, the subject to be taken from some place about Toledo. The Toledo Camera Club will work all summer upon this competition.

AMONG the various platinum papers sold in the United States the Angelo Sepia Platinum, cold development, is one of the best. It offers a large latitude in development, while printing, the image is more visible, the keeping qualities of the paper are of the best, and, last but not least, it is less expensive. Out of the large number of awards at the recent New England Photographers' Convention held in Boston, more than half were for pictures on Angelo Platinum. Mr. Di Nunzio, the manufacturer, is widely and favorably known to the photographic world for many years, and his success in this line is richly deserved.

"If I had at command any other words that stood for more than these—**absolute perfection**—I would use them to convey my opinion of the Century Camera received to-day"
—Extract from a Purchaser's Letter.

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For the convenience of our customers in selecting and ordering mounts, we have prepared a number of assortments of our mounting papers, suited for various special purposes, and arranged in neat portfolios, which are very well suited for preserving prints.

The mounts are in quarter sheets, averaging about 9 x 13. Each is sold at fifty cents, except G, which costs seventy-five cents, and I, which costs two dollars. Ten cents must be added for postage on A, F, G, and H, twenty cents for B, C, D, and E, and fifty cents for I.

The Following Assortments may be Ordered

A Fine Japanese vellums, the most beautiful mounts for platinum prints. Eight sheets in portfolio

B French and English papers, rough and laid; mostly light shades; suitable for general work. Twenty sheets.

C Whites, grays, and blacks, suitable for platinum prints. Twenty-four sheets.

D Whites, creams, and browns, adapted for sepia and brown prints. Twenty-four sheets.

E General utility assortment, containing all grades and colors. Twenty-four sheets.

F Novelty assortment, containing oddities and striking effects. Twelve sheets.

G White and vellum papers for gum bichromate and platinum coating. Ten sheets, price seventy-five cents.

H Silk tissues for protecting prints. Sixty sheets.

I Sample sets of our entire assortment of mounts. Seventy-five sheets, price two dollars.

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No. 1. APRIL, 1904

Trimming, Mounting, and Framing

THE PICTORIAL WORK OF ALEX. KEIGHLEY, F. R. P. S.

A practical, up-to-date volume on a subject whose principles are harder for the beginner to grasp than almost any other in photography. A complete résumé of the reasons, principles, and methods for mounting, with articles on trimming, framing, titling, etc. The only complete, practical, and simple manual on the subject. Beautifully illustrated with artistic and technical plates.

No. 2. MAY, 1904

Printing on Bromide and Gaslight Papers

THE PICTORIAL WORK OF A. HORSLEY HINTON

A treatise on bromide papers unlike any other. Besides giving full directions for toning prints on quick and slow papers, it gives full directions for toning prints to various colors by all the approved processes, for printing borders, for printing from two negatives, etc. Has many technical and artistic pictures.

No. 3. JUNE, 1904

Developing and Developers

THE PICTORIAL WORK OF ERNEST R. ASHTON.

A thorough treatment of development, laying especial stress on factorial or timing systems, and control in development. Containing also a description of the constitution, properties, advantages, and method of use of all the developers employed at the present time. An invaluable handbook, profusely illustrated.

No. 4. JULY, 1904

After-Treatment of the Negative

THE PICTORIAL WORK OF ROBERT DEMACHY

A text-book giving all needed instruction on the improvement of faulty negatives by the various processes of intensification and reduction, general and local. A thoroughly practical account of the different methods, with notes on many subsidiary processes of after-treatment. The number is illustrated by several specimen negatives before and after treatment, printed on transparent paper, besides the usual number of artistic pictures.

No. 5. READY AUG. 10, 1904

Work with the Hand Camera

THE PICTORIAL WORK OF FRANK M. SUTCLIFFE

A treatise of the utmost interest and value to all users of hand cameras. A comprehensive work on all the manipulations of plate and film hand cameras, with articles on the use and development of roll films. Indispensable to all beginners. Profusely illustrated.

LATER NUMBERS

Numbers are in active preparation on more than twenty attractive subjects. Among them we may mention Platinum, Carbon, Gum-bichromate, Ozotype, and Silver Printing, Architectural, Portrait, Landscape, Marine, and Animal Photography, Retouching, Lenses, Telephotography, etc. Numbers will appear monthly, each containing several pictures by one of the masters of photography, and otherwise profusely illustrated.

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MEZZO-TONE PAPER is not merely something new in name, neither is it a mere variation of some other paper. It is new — is different in tone, in surface, and in manipulation from any other paper on the market.

The tone is warm and mellow, not glaringly red, and yet not weak and faded. The texture is neither a rough mat nor a high gloss, is rich and lustrous but not shiny. The effect is novel and pleasing, and the paper works well with almost any negative.

Mezzo-Tone is printed like Solio, cleared in common salt and water, rinsed, fixed, and washed. There is no toning solution. The toning chemicals are in the emulsion itself, and are released for action when the print is immersed in salt and water. For every print the operator puts into the salt water he automatically, so to speak, puts in at the same time the requisite chemicals for toning that print. The chances of failure are reduced to a minimum — no danger of an "overworked" or improperly prepared toner, no expense for toning solution, no bother.

And the results are a delight.

Eastman Kodak Company

ROCHESTER, NEW YORK

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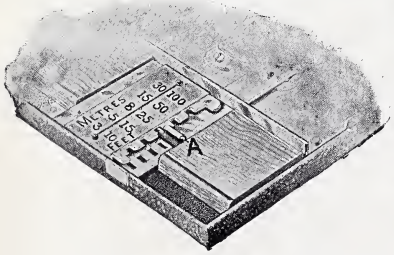
ROCHESTER, N.Y.

AUTOMATIC FOCUSING LOCK

ON THE NO. 3A AND NO. 2 FOLDING POCKET KODAKS.

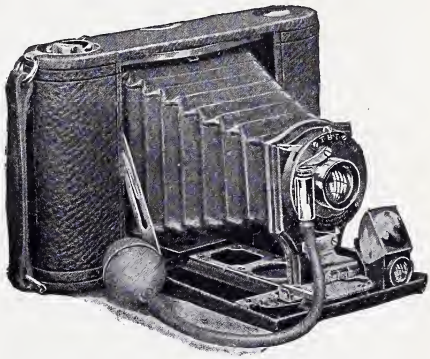
Among the interesting and valuable devices which mark the steady Kodak progress is the new Automatic Focusing Lock which is now supplied on the 3A Folding Pocket Kodaks.



AUTOMATIC FOCUSING DEVICE

As applied to these cameras its scope is for 10, 15, 25, 50 and 100 feet. The regular focusing scale is furnished in addition, so the operator has the option of using either method of focusing. For any kind of work where one is making a number of exposures, all with the same focus, the advantages of the Automatic Focusing Device are very marked. For instance, if the operator is making landscapes or views on the water, he sets the lock at 100 feet, at which distance all of his pictures will naturally be made. Presently the picture is taken; the camera is closed and the lock still left at 100 feet; another picture presents itself a few minutes later, the camera is opened *and the front pulled out until it catches*, exactly as with a fixed focus instrument. Not an instant is lost in focusing. It gives the camera fixed focus, simplicity and certainty. The device increases greatly the value of the camera, but no change has been made in its price, which remains as heretofore at $20.

The same idea has been applied to the new model No. 2 Folding Pocket Kodaks, but these instruments having a shorter focus lens, a smaller number of focusing points are used. The old model of this camera had a fixed focus, a single lens and a box front shutter. The new model may be used as a fixed focus camera, yet by means of the Automatic Focusing Device may be instantly locked at 8, 20 or 100 feet focus as desired.



NEW MODEL NO. 2 FOLDING POCKET KODAK, $15.00.

The new lenses being Rapid Rectilinear and the Automatic Focusing Device permitting the instrument to be more accurately adjusted for the work in hand than heretofore, it has *more than double the speed* of the old model.

The shutter is the same style that has given such perfect satisfaction on the No. 3 and No. 3A Folding Pocket Kodaks for more than a year past.

All of these improvements have been made with no sacrifice of simplicity and at no increase in price, which remains as before at $15.00. The new Model No. 2 Folding Pocket Kodak is everything that a 3½ x 3½ camera should be.

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AN AMBITIOUS AMATEUR FEELS THAT MUCH TIME HAS BEEN LOST BECAUSE WE DID NOT DISCOVER MR. STEADMAN AND HIS BOOK ON "HOME PORTRAITURE" YEARS AGO.

There have been so many "helps" to photographers, that didn't help, offered to the amateur, that when one appears that gets right down to everyday practical use, it's almost too good to believe. But that is just what has been accomplished by Mr. Frank Morris Steadman in his "Home Portraiture." Mr. Steadman is a professional of broad experience working under amateur conditions, and by his practical knowledge knows just where the amateur portrait-maker fails. And better still, he tells how to avoid failure in terms that any one can understand. Messrs. J. W. & Geo. H. Hahn have sent us a letter from one of their customers, with the warning that the customer's name must not be used. We are sorry to hold it back, for it is well known among photographic workers. A copy of that part of the letter referring to Mr. Steadman's books follows:

. . . Also send another copy of Mr. Steadman's book on portraiture. That will make the seventh copy I have bought, for just as soon as I get one, some discouraged would-be portrait-taker comes in, and I cannot resist the temptation to help her out by giving her his book. When I think of all my experimenting and all my failures in the portrait line, and how much I might have been saved if the Eastman Kodak Company had only discovered Mr. Steadman and his book three years ago, I feel abused. You may send me one of the seventy-five cent copies this time. Perhaps I shall be better able to keep that. I want it for constant reference. It taught me more in half an hour than I have been able to study out in three years from books or experience, and, as you know, I have worked pretty steadily. Sincerely yours,

---

Just since writing the foregoing, another friend has appeared who wants a copy of that book. Please send me a twenty-five cent copy for him. I must stop talking about the book. Every one wants it as soon as he or she hears of it.

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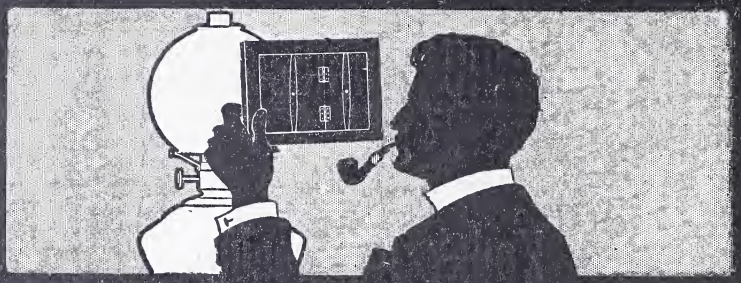

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